Soybean Digest

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Official Publication

AMERICAN SOYBEAN ASSOCIATION

VOLUME 15 • NUMBER 8 MARCH • 1955

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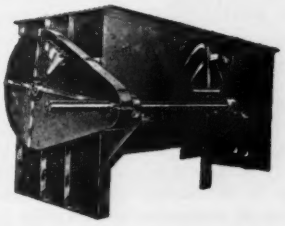

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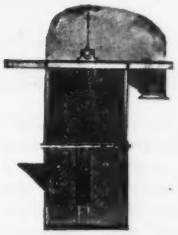

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EDITOR'S DESK

Changes Coming in Processing

Recent news releases from the Southern Regional Research Laboratory at New Orleans indicate that the new filtration-extraction unit developed there in studies on cottonseed processing may have a definite place in the soybean industry. Two commercial installations are now being made in order to give industrial-scale evaluation. Pilot plant operation has apparently been very successful.

In effect, the process reduces the equipment needed for solvent extraction of oilseeds by doing in a unit about the size of the family washing machine the same job which formerly took much larger and more extensive equipment. This washer size unit, in pilot plant tests, has shown a capacity of about 25 tons per day.

Most of the basic equipment in solvent plants has remained very much the same for the past several years. New units have embodied new engineering, but the basic process has remained the same.

This new filtration-extraction process, if it proves out in commercial usage, may materially reduce the costs of conversion from expeller to solvent equipment in present-day plants, and make the much-debated step much more of a reality.

The last word in processing techniques has not yet been written. This and other developments may materially change the face of the processing industry in the next decade. American ingenuity, coupled with the research facilities of our state and federal institutions such as the Regional Laboratories, may make the processing of agricultural products into a simplified and more foolproof industry.

Higher Price Will Get More Acres

The present dislocations in soybean oil meal prices and supplies serve as dramatic demonstration of what happens when the natural laws of supply and demand are replaced by governmental planners. Because the ceiling price on meal is too low, there is no meal available. There is only calcium soybean oil meal, limestoned soybean oil meal, or similar products. The entire feed manufacturing and feeding industries are thrown out of balance. Rather than holding prices down, ceiling price regulations have in effect made the desired product unavailable.

As soybean producers we have not felt this to be our worry. As feeders of soybean oil meal it has been our worry. However, as planting season arrives it becomes more and more apparent that because of ceiling prices on soybeans and soybean products and the consequent disruption in price relationships, there just will not be sufficient acreages of soybeans planted this year to meet the protein needs for 1952. Next fall we are likely to find ourselves with a large corn crop and no protein to be fed with it. In the end we will have less production of livestock products than though we had produced greater acreages of soybeans, thus greater tonnages of soybean oil meal.

It is our guess that unless soybean oil meal ceilings are allowed to move up to a point where soybean prices will be affected there is no hope of getting the needed soybean acreage. A price of $3 per bushel or more to the farmer for soybeans during March and April would achieve that result. Without $3 soybeans the USDA boys had better do some fast figuring on livestock production—for it takes 10 bushels of corn to do what 6 bushels of corn and 100 pounds of soybean oil meal will do. And the combination does it far cheaper.

ASA's 32nd Convention to Purdue

The 32nd annual convention of the American Soybean Association will be held at Purdue University, Lafayette, Ind., on Sept. 9, 10 and 11, 1952. Mark those dates on your calendar now. Make your plans to attend. Full details on program and arrangements will be carried in future issues of the Soybean Digest.

Present plans call for all formal meetings to be held at the Purdue Union on Sept. 9 and 10. The annual field day will be held on Sept. 11, in conjunction with the annual event sponsored by Purdue University for Indiana farmers. Housing accommodations will be available at the Purdue Union, at the Hotels in Lafayette, and at motels and motor courts nearby.

Mark the dates now. As more information becomes available your exact plans can be made and your reservations entered.

Margarine Repeal Coming in N. Y.

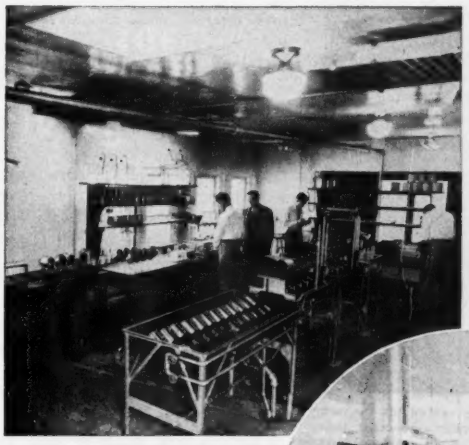
For the first time in many years of attempted change in the New York margarine laws, a bill providing for the repeal of the restrictions on the sale of yellow margarine in that state has been reported out of committee and will be considered by the Assembly. The ways and means committee, which traditionally has boxed such bills and prevented their coming to the floor for consideration, has reported out the Strong-Bauer Bill. Before this copy reaches our readers the vote will have been taken on the floor of the Assembly, and will also have been considered in the Senate if passed by the Assembly.

Assuming the final passage of this bill before the New York General Assembly adjourns in Mid-March—and it is entirely within the realm of possibilities that the opponents may succeed in delaying action to the point where action can not be completed before adjournment—there will be but seven states left on the list of those still retaining outmoded and antiquated restrictions on the use of this wholesome food product by their residents. New York is an important state to the soybean industry, for it is a large consuming area, and one which will use increasing amounts of margarine as it becomes available in the form most desired.

Whether or not the bill is passed in this session of the New York General Assembly it will be passed soon—another session of this governing body is coming.

As the Digest goes to press we have word that the Strong-Bauer Bill has passed the Assembly by a vote of 90 to 52. It still has the hurdle of the Senate.—EDITOR

Serving The Soybean Industry



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Here are some of the winners of the Illinois 10-acre soybean growing contest and the men who made the awards. Back row, left to right: J. C. Hackleman, extension agronomist, University of Illinois; L. Parke Kerbaugh, Fred W. Bergmann; and A. F. Stephens, general agricultural agent, Gulf, Mobile & Ohio Railroad. Front row: J. Lyle Trisler, president Illinois Crop Improvement Association; and H. L. Stiegelmeier.

High Yields in Illinois Contest

Bert Bonwell, Chrisman, was winner of the Illinois 10-acre soybean-growing contest for 1951. His yield, 41.32 bushels per acre, was lower than a number of others in the contest, but he led with a total score of 90.18 due to a low cost of production, $358.54 for the 10 acres. Bonwell grew the Adams variety.

Bonwell was second place winner in the Illinois contest in 1950, when he also had the lowest cost of production.

Second place winner in the 1951 contest was H. L. Stiegelmeier, Normal. His total score was 90.12 and his Adams beans yielded 48.97 bushels on a field that had been limed in 1935 and phosphated in 1936. The field was fall plowed, disked, harrowed twice and the beans planted in 40-inch rows at the rate of 50 pounds per acre.

L. Parke Kerbaugh, Stanford, was third place winner, with a yield of 50.82 bushels per acre, the highest in the contest, and a total score of 90.04. His field was limed in 1948 and phosphated in 1942. It was spring plowed and Adams soybeans were planted May 19 in 21-inch rows at the rate of one bushel per acre.

Fourth place winner was Fred W. Bergmann, Trenton, with a yield of 44.70 and a score of 87.27.

Stiegelmeier, Kerbaugh and Bergmann received first, second and third place awards, respectively, presented by the Gulf, Mobile & Ohio Railroad Co. to the winning contestants in the 30 Illinois counties served by the Railroad. Bonwell does not live in GM&O territory.

Winning awards has become a habit with Stiegelmeier as a result of his many outstanding contributions as a breeder, producer and exhibitor of improved strains of soybeans, hybrid seed corn and other crops. He has been a consistent winner at the Illinois State Fair, the Illinois Ten-Acre Corn Growing Contest, the International Hay and Grain Show, the Royal Winter Agricultural Fair at Toronto and other shows.

GROWERS

Iowa Record Tumbles

Paul McLeary, Linden, Iowa, won the title of Master Soybean Grower in Iowa for 1951, and also set a new championship record. McLeary produced 51.21 bushels of soybeans per acre to break all previous Iowa records established in the annual contest.

The champion made his high yield with Adams soybeans planted in 20-inch rows. He planted 60 pounds of Adams soybeans May 23, in 40-inch rows. McLeary cultivated these beans once, then planted 40 more pounds of Adams soybeans in between the 40-inch rows. He cultivated the beans in 20-inch rows twice with a conventional cultivator, removing some of the rear shovels.

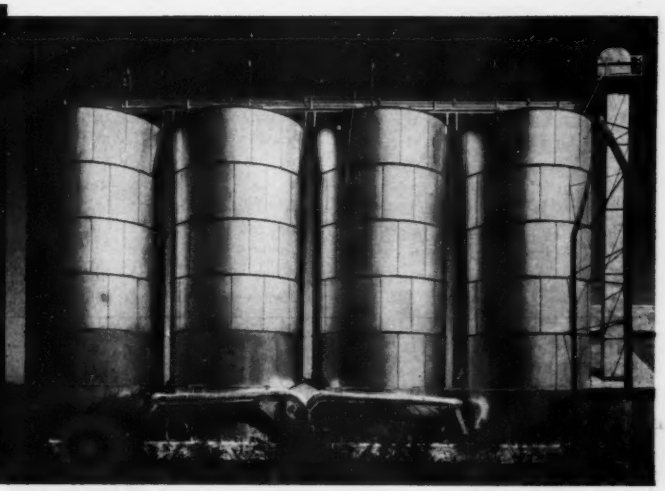
McLeary applied no commercial fertilizer or manure in 1951. The field had last received fertilizer in 1948 when McLeary applied 150 pounds of 10-20-0 per acre to the oats crop. The field had been in clover pasture in 1949 and corn in 1950.

Second place winners in the Iowa contest were N. M. Leonard & Son, Waukee, with a yield of 51.04 bushels per acre. Third place winner was Glenn Lester, Swan, with 50.64 bushels.

Four of the Iowa yield contestants produced over 50 bushels per acre, and all four grew Adams. John Hamm, Prole, produced 50.09 bushels per acre.

PAUL McCLEARY

Plan Now for Storage Profits Next Fall



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Missouri Seed Show

M. E. Claybury, Hamden, Mo., was first prize winner with a display of yellow soybeans at the 46th annual Missouri Good Seed Show at Kirksville, Mo., Jan. 24 and 25. He entered Wabash.

The show is sponsored by the Missouri Seed Improvement Association.

Of the 171 entries in the show, 47 were soybeans. Of the 47 entries, 16 were Ogden, 13 Wabash, six Lincoln, four S-100, two Chief, two Ralsoy and one each Dortchsoy No. 2, Bavender and Brown.

E. J. Van Horne, Mexico, Mo., was second place winner in yellow soybeans with Wabash. Third place winner was George Koester, Florissant, Mo., also with Wabash.

Winner of first place in the green soybean class was John Ellington, Portageville, Mo. Second place winner was T. F. Baker, Malden, Mo. Third place was won by Arvil Adams, Portageville, Mo. All three showed Ogdens.

First place winner with black or brown soybeans was H. and D. Hill, Morley, Mo., with the Brown variety.

Soybean varieties and best practices in their production were discussed by L. F. Williams, soybean specialist at the University of Missouri.

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Graze Soys in Georgia

Farmers in Bulloch County, Ga., use large soybeans for early summer grazing, according to County Agent Byron Dyer as reported in Progressive Farmer. Varieties are Mammoth Yellows and Biloxi.

"We also put these in the early corn," says Dyer. "A good many farmers plant corn and soybeans early and in about six weeks put small pigs into these fields. The pigs can stay right on in these fields until corn is ready to hog off."

Bulloch farmers see to it that little pigs are not as tall as the soybeans, because if they can reach the soybean plant buds, they eat them and ruin the crop. As long as the pigs can reach only the soybean leaves, plants continue to grow.

County Agent Dyer says Bulloch County farmers are using more protein supplement for their hogs, including soybean oil meal. They are trying for larger litters and are finishing out their pigs earlier. Many farmers finish them out before six months.

An example of Bulloch County farmers is R. P. Mikell who sells 120 to 130 top hogs annually. Spring pigs are farrowed to start on green oats. Then they go to dry oats and later to early corn with soybeans.

Mikell keeps protein supplement before them all the time. Fall litters start on soybeans or millet. Following this they go to the cornfields with protein supplement, and topping out for market begins at a little over five months of age.

—sbd—

Please be sure to mention the Soybean Digest when writing to our advertisers.

FEEDING

High-Roughage System

Dairymen who are not satisfied with their present system of raising calves, either because it is too expensive or because it is too hard to raise healthy calves, may want to try the high-roughage system that has been developed at the Ohio Experiment Station. It is still somewhat in the experimental stage, but workers are raising big roomy cows with it that apparently will be profitable herd replacements.

For several years the Ohio workers have been raising calves with a lot of roughage and small amounts of grain. Feeding plenty of good hay to young calves promotes the early growth of rumen microorganisms necessary to digest roughage. In addition, inoculating the young calf's rumen with cud material from older cattle provides the rumen bacteria and protozoa that break down the feedstuffs into more suitable feed for the calf.

This makes it possible for the calf to grow and develop normally on a ration of good quality hay plus a simple, low-cost grain mixture. When this system is used, milk or milk substitutes need only be fed for about seven weeks.

As soon as the calf is eating about one-half pound of hay per day, one-fourth pound of grain can be fed daily. The same grain mixture being fed the milking herd is usually satisfactory, or a simple mixture containing shelled corn, oats, soybean oil meal, bran, and salt can be fed, mixed to contain from 14 to 16 percent protein.

This method is not intended to fatten calves, so would not be satisfactory for producing veal calves.

For details on this system see:

RAISING CALVES ON THE OHIO HIGH-ROUGHAGE SYSTEM. By J. W. Hibbs and W. D. Pounden, Hoard's Dairyman, Feb. 10, 1952.

RAISING CALVES AS RUMINANTS. By J. W. Hibbs and W. D. Pounden. Reprint from Farm and Home Research, Mar.-Apr. 1950. Ohio Agricultural Experiment Station, Wooster, Ohio.

Story of Mixed Feeds

"Home mixing is an antiquated method of obtaining balanced rations for your livestock and poultry," states Marve Narramore in the Story of Formula Feed, 20-page booklet issued by Feed Institute, Inc.

"College and private research constantly shows the necessity for mixing a number of ingredients to obtain the maximum results from a completely balanced ration. The formulas of today are highly complex and all of the ingredients cannot be properly dispersed throughout the feed without the aid of mechanical mixing . . .

"NO single ingredient is THE most important. The most important nutrient is the one that is missing. To make certain NO nutrient is missing it is doubly important for you to feed a balanced ration to your hogs."

THE STORY OF FORMULA FEED, by Marve Narramore, Feed Institute, Inc., 842 Des Moines Bldg., Des Moines 9, Iowa.

Cottonseed Meal Use

The nutritive value of cottonseed meal as a protein supplement for swine has largely been obscured in the past by the toxicity of this product to non-ruminant animals. New methods for the detoxification of cottonseed meal, however, give promise of a more extensive use of it in swine rations. For this reason, reliable information on the nutritive value of the detoxified product is needed.

In University of Georgia experiments as high as 35 percent of the total ration was fed as detoxified cottonseed meal to weanling pigs. No typical symptoms of gossypol toxicity occurred. But dermatitis, depigmentation of the hair coat of the Duroc pigs, a slow rate of growth as well as a reduction in feed efficiency were encountered.

These deficiency symptoms suggest that this detoxified cottonseed meal is deficient in factors essential for optimum growth and well-being of the pig. Neither vitamin B-12 nor streptomycin appear to be the first limiting factors.

When cottonseed meal and solvent soybean oil meal were fed together half and half, the soybean oil meal apparently supplied some factor or factors in which the cottonseed meal was deficient.

SPECIAL SOLVENT COTTONSEED MEAL WITH AND WITHOUT A VITAMIN B-12 SUPPLEMENT AND STREPTOMYCIN AS A SOURCE OF PROTEIN FOR PIGS. By I. A. Dyer, A. E. Cullison and W. J. Hays, University of Georgia. Journal of Animal Science, Aug. 1951. Vol. 10, pp. 624-628.

—s b d—

NEW B-12 PROCESS

An entirely new process for the production of vitamin B-12 concentrate has been developed and is in use by at least two commercial firms for making feed supplements, states Dr. G. E. Hilbert, chief of the Bureau of Agricultural and Industrial Chemistry, in his report for the fiscal year 1951, released by the U. S. Department of Agriculture.

The B-12 concentrate under the new process is produced by deep-tank fermentation of an inexpensive medium with a special mold, *Streptomyces olivaceus.*

Hilbert also reported that addition of small amounts of phytic acid, obtainable from corn-steep liquor, to soybean oil during the refining process was found to counteract the injurious effect of metal contaminants.

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BROKERS TO THE SOYBEAN PROCESSOR

The extraction tower in place.

THE COVER PICTURE

Being transported through the downtown section of Decatur, Ind., is the first section of Central Soya Co.'s mammoth new solvent extraction tower, said to be the largest ever built. The section, one of six, measured 13 by 15 by 21 feet. A special police escort was provided for the unit and its flatbed conveyor through the city to the Central Soya plant.

Norman F. Kruse, vice president and technical director of Central Soya, has announced that the final piece of operating equipment for the company's new solvent plant has been installed.

The extraction unit was fabricated by the French Oil Mill Machinery Co., Piqua, Ohio, according to plans and specifications developed jointly by French and Central Soya's engineering and technical departments, headed by J. J. Thompson and Kruse.

A large portion of the operating parts of the unit were fabricated at the Soya Co.'s Gibson City, Ill., plant.

Because of its size and weight special alloy metals were used in the construction of all working parts. More than a year was required to complete the entire fabricating projects with some equipment such as roller mills being purchased and imported from the German manufacturer who supplied identical units for the original Central Soya extraction plant at Decatur in 1937.

Feat in Transportation

Transporting the new extractor to the Decatur plant site was an undertaking of gigantic and painstaking proportions.

The unit, a solvent extraction tower, is so massive that ordinary modes of transporting it to the installation site had to be discarded. It is the largest extractor ever fabricated in this country, and in the world, Kruse stated. Combined weight of the six sections and the running parts is over 200,000 pounds; the assembled dimensions being 13 by 64 feet. The sections range in weight from 5,000 to 21,000 pounds.

Special permits and licenses from state, county and city officials in Indiana and Ohio were secured to move the unit via large flatbedded trucks. Rail transportation was not possible due to the extremes in size not permitting clearance.

It was necessary to transport all of this machinery in a series of six or seven truckloads to be delivered at the plant on successive days.

Each load was escorted out of Piqua by a special police detail. Similar service was rendered by state and local officials all along the route up U. S. Highway 127 to Van Wert and then west on U. S. Highway 224 to Decatur. Special routing to avoid narrow bridges and other obstacles was worked out months in advance.

The Morrow Trucking Co. of Piqua had accepted this unusual and difficult assignment.

Upon arrival at Decatur, Ind., the separate sections were housed in the new addition to the existing solvent extraction building. John N. Neering supervised the unloading and erection of the unit.

Special building designs, including rigging equipment with supporting steel and a huge monorail beam were provided in the building plans to facilitate the installation of the massive extraction tower.

Installation of the unit, its auxiliary equipment, piping and controls was completed about Mar. 1. The completed assembly embodies the latest developments in the design and operation of oilseed extraction equipment and its installation will bring the company's solvent expansion program to near completion.

"When in operation, the newly constructed plant will be the largest single solvent extraction plant in the world," Kruse concluded.

Front cover photo is by Decatur (Ind.) Democrat.

—s b d—

TENNESSEE SEEDSMEN

Largest attendance in the history of the Tennessee Seedsmen's Association was reported at the annual meeting in the Andrew Jackson Hotel, Nashville, Tenn., Jan. 30.

Officers elected were:

J. W. Robinson, Bradley Supply Co., Cleveland, Tenn., president; Lindsey Simmons, Simmons Supply Co., Lewisburg, Tenn., first vice president; Cecil Moss, Cherry-Moss Grain Co., Union City, Tenn., second vice president; and C. Hays Hollar, Hollar Seed Co., Newbern, Tenn., secretary-treasurer.

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Executive Offices: Fort Wayne, Indiana

Perry Soybean

By A. H. PROBST
Associate Agronomist, U. S. Regional Soybean Laboratory

And G. H. CUTLER
Assistant Chief in Agronomy, Purdue Agricultural Experiment Station

A. H. Probst, U. S. Regional Soybean Laboratory and Purdue agronomist, takes a close look at Perry which grows medium tall, stands well, pods heavily, and is outstanding in yield in its area of adaptation.

Development of a new variety of soybeans to be called Perry is announced by the U. S. Department of Agriculture and cooperating state agricultural experiment stations in Indiana, Illinois, Missouri, and Kansas.

High-yielding and high in oil content, Perry is adapted as a full-season variety in southern Indiana, southern Illinois, central and southern Missouri, and in eastern Kansas—an area south of a line extending east from about Abilene, Kans., through Manhattan, following the Kaw River Valley, and then eastward slightly north of Columbia, Mo., Edgewood, Ill., and Vincennes, Ind.

Seed for general planting of Perry in its adapted area in 1952 is not available. All seed from the 1951 crop is being allotted to experienced certified seed producers for increase so there will be plenty of seed for general planting in the 1953 season.

Perry is a pureline selection made in 1945 by A. H. Probst and G. H. Cutler at the Purdue Agricultural Experiment Station from a cross between Patoka and L7-1355. The cross was made in 1939 at the University of Illinois by L. F. Williams of the U. S. Regional Soybean Laboratory.

Perry has medium to large-sized yellow seeds with a hilum which is dark gray bordered with brown. The seed is rather similar in size, shape, and color to Patoka. The pods are medium to large in size, mainly two- and three seeded, dark gray in color, and are borne primarily on the central stems.

Perry is being released in Illinois, Indiana, Kansas and Missouri and is best adapted in the shaded area shown in the map. It has been tested at the locations shown.

COMPARISON OF PERRY WITH OTHER VARIETIES

Variety	Yield Bu./A.	Maturity index*	Lodging Score†	Plant height, inches	Seed quality Score‡	Seeds per lb.	Oil,§ %
A. 1945-1950							
No. of tests	81	69	71	76	62	77	77
Perry	33.8	0	1.9	38	1.8	2650	21.5
Wabash	31.1	-2.8	2.1	42	1.5	3150	21.2
Chief	30.5	-4.2	2.7	48	1.9	3500	20.6
Patoka	29.5	-2.5	2.3	35	1.9	2550	20.2
B. 1946-1948							
No. of tests	28	24	25	27	24	28	28
Perry	32.0	0	2.0	36	2.0	2700	21.9
S-100	28.8	-9	2.4	45	1.7	3300	19.8

* Days earlier (-) or later (-) than Perry.

† Based on a score of 1-5. 1 is very good, 5 is lodged badly.

‡ Based no a score of 1-5. 1 is very good, 5 is very poor.

§ Dry basis on composite samples of all locations each year in regional tests.

Perry is the ninth in a series of superior varieties that have come mostly out of the USDA-state cooperative soybean breeding program since about the end of World War II. Others adapted in areas from north to south are Monroe, Blackhawk, Hawkeye, Adams, Lincoln, Wabash, Ogden (developed by the Tennessee Agricultural Experiment Station), and Roanoke. These have given most of the nation's producers varieties of soybeans that average 20 percent higher in yield of beans and 10 percent higher in oil content, than varieties previously grown.

A superior variety has been lacking only in the upper south and south central belt between the adapted producing areas for Wabash and Ogden. Perry will help fill the gap, replacing Wabash, Chief, Patoka, Gibson, and Boone in the northern part of this belt. Breeders now also have under development another variety that is expected to replace S-100 in the southern part of the belt between Wabash and Ogden, thus providing superior varieties for all of the big soybean producing region.

Perry is described by the breeders as an erect-growing, yellow-seeded variety about three days later in maturity than Wabash and nine days earlier than S-100. It has outyielded Wabash consistently in its adapted area and also has exceeded Wabash in oil content and standing ability. In 81 regional tests it averaged 2.7 bushels per acre higher in yield and 3 percent higher in oil content than Wabash.

It also has averaged 3.2 bushels higher in yield and 2.6 percent higher in oil content than S-100. Perry is less susceptible to the disease frogeye leaf spot than the variety Patoka, but is not as resistant as Wabash. Even under conditions of severe frogeye leaf spot infection, however, Perry consistently outyields Wabash.

Best Adapted Varieties

The map shows the latest recommendations of agronomists in the soybean growing regions of the United States. Do not plant varieties north or south of their recommended latitudes.

Figure 1. Hawkeye soybeans at Sussex, Wis.

Seed Treatments and Inoculation

FOR SOYBEANS

By RESEARCH DEPARTMENT, THE NITRAGEN CO., INC.

IN THE BEGINNING of soybean culture in America, seed treatment and inoculation were synonymous because the latter was the only seed treatment considered necessary for growth of a good crop of beans. However, with the advent of "chemical farming," the term seed treatment has assumed a multiplicity of meanings:

1—Inoculation with rhizobia.

2—Coating with fungicides.

3—Addition of insecticides.

4—Supplying any of a number of hormone or growth-promoting substances.

5—Seed scarification.

6—Reinforcement with various nutrients which are considered essential for maximum early growth of the seedlings.

Coating of the seed has become a very popular means of disseminating substances which are applied in small quantities.

With the increase in use of the seed coat as a medium of dissemination, the problem of compatibility of one substance with another has become increasingly complex. Most research studies have dealt primarily with the effects of single treatments; the ability of the various seed treatments to compete with one another has not received sufficient attention.

Inoculation and coating with antidecay chemicals are the two treatments used most commonly on soybean seed. Inoculants are preparations containing living nodule bacteria (rhizobia) which are applied to leguminous seed to ensure effective nodulation, vigorous growth and high yields. Fungicides, on the other hand, are applied to soybean seed to prevent growth of fungi and bacteria which might injure or destroy the planted seeds or seedlings.

The chief effects of chemical seed treatments are upon stand. When soils are heavily infested with damping-off fungi or when poor quality seed are sown, the stand may be considerably improved by the latter treatment, especially when soil and weather conditions are unfavorable for good seed germination. That good stands and growth are both essential for high yields cannot be disputed.

Since there are no rapid methods of predetermining the degree of need for inoculation or for chemical seed treatment it would be highly advantageous to be able to use both on the same seed with a reasonable degree of certainty that sufficient numbers of rhizobia would survive and bring about effective results. Accordingly, experiments were initiated to determine the degree of compatibility of rhizobia with certain fungicides and to study some of the factors affecting this relationship.

The fungicides first used as protective coatings for seed were largely compounds containing either copper, mercury, zinc or phenolics. Seed treated with these chemicals could not be inoculated successfully by conventional methods.

Other fungicides such as "Arasan," "Phygon," and "Spergon" which are non-phenolic, relatively insoluble in water and which contain no heavy metals are reported to be less toxic to the rhizobia. Results of field tests planned to study compatibility of rhizobia with the non-metallic, non-phenolic organic fungicides have differed. It has been indicated that if conditions are right and care is taken to follow directions, seed treated with these fungicides can be inoculated successfully. An attempt was made to devise laboratory techniques to measure the factors affecting compatibility of seed protectants and inoculants and to test the relative toxicity of several commercial protectants to different species of rhizobia.

In the preliminary study, a laboratory petri-dish technique was first employed. (Figure 2)

The chemical dusts are weighed and transferred to paper discs which are then placed on a layer of nutrient agar seeded with the nodule bacteria. The plates are incubated for one to two weeks and examined. The clear or black area (Figure 2) surrounding each disc is the zone of toxicity where the nodule bacteria were unable to grow.

Six different species of legume bacteria were tested with three different commercial seed protectants by this technique. A considerable variation in the susceptibility of the various rhizobial species to the action of the protectants was noted and there was an apparent difference between protectants. With this technique it is impossible to tell whether the difference in the size of the zones of the different protectants was due to greater toxicity or to differences in ability to diffuse through the growth medium.

Simulated Soil Conditions

The plate technique described previously is valuable in determining differences in tolerance of species and strains of nodule bacteria providing the chemical seed protectant is soluble to some extent and can diffuse from the paper disc. The presence of a zone proves that the chemical is toxic to rhizobia and that it is at least slightly soluble. The absence of a toxic zone around a disc containing a seed protectant indicates one of three conditions:

1—The fungicide may be toxic to rhizobia and non-diffusible.

2—It may be non-toxic and non-diffusible or

3—It may be non-toxic and diffusible.

A second type of laboratory experiment was planned to study the effects of the same three fungicides under conditions approximating those which occur naturally when a grower inoculates chemically treated seed. Samples of peat inoculant and homogeneous mixtures of the peat inoculant and each of the fungicides were planted in moist sand to simulate natural conditions when seed are planted in soil. Portions of peat inoculant and of inoculant-fungicide mixtures were also kept in closed jars as controls. At regular intervals comparable samples from each treatment were plated to determine actual populations of living rhizobial cells. Each of the fungicides "Arasan," "Phygon," and "Spergon" caused a marked decrease in numbers of living rhizobia in both the control jars and the moist sand. However, the numbers of rhizobia surviving in the fungicide-inoculant mixtures were considerably larger in the samples which were planted in moist sand.

Under natural soil conditions many of the rhizobia are apparently able to migrate from the toxic area surrounding the seed (treated with a fungicide) and escape injury when the inoculated chemically treated seed are planted in moist sand or soil. This contention is supported by reports that nodules on plants grown from inoculated chemically treated seed occur commonly on the lateral roots.

If this is generally true, it explains why a good moisture supply in the soil at time of planting is essential for survival of the rhizobia. It would also explain the necessity of sowing these seeds immediately after inoculating for maximum inoculation effects.

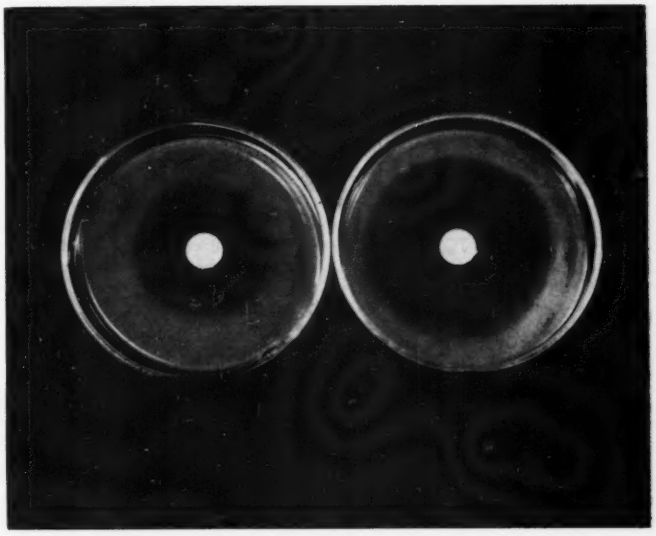
Using the technique described above it was found that the harmful effect of the fungicides on the nodule bacteria was directly related to the inoculant-fungicide ratio. Therefore, *by increasing the amount of inoculant used on the seed two or three-fold, one can offset, to a large extent, the loss in numbers of viable rhizobia resulting from the fungicide action.*

Field Results

Field tests with soybeans have been conducted for the past two years in Wisconsin to study this same problem under actual field conditions. Soils which had not grown a crop of soybeans previously were selected for these tests. In 1950, "Arasan," "Phygon," and "Spergon" treated and untreated soybean seed of the Hawkeye and Lincoln varieties were inoculated in the conventional manner.

Chemical treatment of the seed was

Figure 2. Laboratory method of determining toxicity of seed protectant chemicals to rhizobia.



accomplished by adding the recommended amount of the respective chemicals to measured quantities of seed in a closed vessel and agitated until each seed was thoroughly coated. The seed were usually chemically treated several days before planting time. Inoculation was done in the fields immediately before planting.

The controls consisted of untreated inoculated plants and chemically treated non-inoculated plants. Seed disinfectants and inoculant were used in accordance with directions of respective manufacturers. Soil moisture was optimum at time of planting.

The nodulation and growth of plants from the inoculated chemically treated seed were not significantly different from that of the plants receiving only the inoculation treatment. This was true with each of the seed disinfectants tested. Growth of the plants from the inoculated "Arasan"- treated seed and of those receiving only the inoculation treatment is shown in Figure 1.

All of the inoculated plants bore clusters of large nodules, whereas the non-inoculated plants were practically free of nodules. There were no significant differences in stand resulting from chemical treatment of the seed; stands were excellent in all of the plots.

In 1951 field studies were conducted to determine the effect of amount of inoculant and method of application on nodule formation, stands and yields of plants grown from "Arasan"-treated soybean seed. Each plot consisted of three 30-foot rows 36 inches apart. Each treatment was replicated three times. Treatments and results are summarized in Table 1.

TABLE 1
Influence of "Arasan" on stand, yield, and nodulation of Hawkeye soybeans

Treatment	Without Arasan			Arasan-treated			Incr. from use of Arasan	
	Stand	Yield	Effectively nodulated	Stand	Yield	Effectively nodulated	Stand	Yield
	bu./A		% +	bu./A		%	%	%
Control (non-inoculated)	163*	14.3	0	146	12.7	0	0	0
Wet method of inoculation								
Inoculated X**	117	15.7	68.3	127	15.9	63.3	8 5	1.3
1/3 X	112	12.4	30.0	113	12.5	31.7	0.9	0.8
Dry method of inoculation								
Inoculated X	158	15.9	36.7	151	14.0	25.0	0	0
1/3 X	170	15.7	10.0	157	14.6	5.0	0	0

* Plants per 30-ft. row. All data are averages for the three replicates.
\+ Plants having clusters of large nodules around upper tap root; percentage figures are based on 60-plant samples (two 30-plant samples taken at five-week intervals).
** X is the regular amount recommended by manufacturers.

Dry, Wet Methods

The non-inoculated plants were yellow, stunted in growth and practically devoid of nodules, whereas inoculated plants were vigorous and deep green in color. There were no differences in appearance of the inoculated plants irrespective of chemical seed treatment, method of inoculating or amount of inoculant applied. However, the data (Table 1) show that the percentage of plants with effective nodulation was considerably larger when the wet method of application was employed and also that larger amounts of inoculant were beneficial. The latter result was especially marked when the dry method of inoculating was used. Nodulation of plants from the "Arasan"-treated inoculated seed was not markedly different from that of plants receiving only the inoculation treatment *when the wet method of application of the inoculant was employed*. However, when the inoculant was applied dry the protectants had an adverse effect on nodulation.

Yields of beans were not especially high in any of the plots but in general the inoculated plants produced a higher yield than did the non-inoculated ones. Failure to obtain larger increases in yields from the wet-inoculation treatment was attributed to the stands. The rate of seeding was considerably lower in the plots where the inoculation was applied wet both with the "Arasan"-treated and untreated seed. The retarding effect of the wet-inoculation treatment can be neutralized by allowing the seed to dry for 15 to 20 minutes after inoculating and by advancing the setting of the drill for rate of seeding.

Discussion and Summary

Results of these studies show that although "Arasan," "Phygon," and "Spergon" have a detrimental effect on the nodule bacteria, soybean seed treated with these products may be inoculated successfully if reasonable precautions are observed.

First of all, seed should be inoculated immediately before planting.

Soil moisture is a second important factor. When the moisture content of the soil is low the rhizobia are apparently unable to escape from the toxic zone around the seed; consequently abnormally large numbers of the nodule bacteria are killed.

The detrimental effect of seed protectants on rhizobia is directly proportional to the fungicide-inoculant ratio on the seed. Accordingly, injury to the bacteria may be offset, at least to some extent, by using larger amounts of the inoculant. It is especially important to use increased dosages of inoculant on seed heavily coated with the chemical or whenever the inoculant is applied dry.

These studies indicate further that the wet method of inoculating chemically treated seed is preferable. This is probably due to the fact that the inoculant adheres to the seed better when water is used. However, to attain the desired rate of seeding when using the wet method of inoculating it is advisable to advance the setting on the drill, avoid use of too much water, and allow the seed to dry for 15 or 20 minutes before planting.

Dry application of inoculant to soybean seed resulted in fewer effectively nodulated plants. However, the results showed that the percentage of plants with effective nodulation was larger when the dosage of inoculant was increased.

It might be pointed out that the experiments conducted by the Nitragin Co. were in Wisconsin and may not apply elsewhere. There is need for similar tests in other parts of the country before conclusions can be drawn in this whole question of seed treatment and inoculation.—EDITOR

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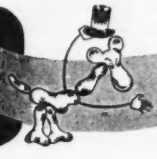
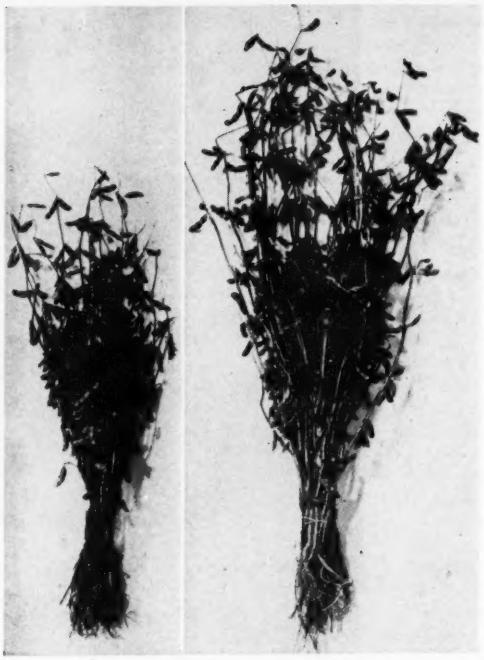


The Pre-Tested Inoculator
The Crop and Profit "Pepper Upper"

Soybeans Flourish on Poor Land-- and Fertile Land

By H. J. SNIDER

Assistant Professor, Soil Experiment Fields, Illinois Agricultural Experiment Station, Urbana, Ill.



Soybeans grown on the Newton Field 1950. Bundle on left from untreated land. Yield 12 bushels. On the right, from land treated with limestone, rock phosphate and muriate of potash. Yield 29 bushels. Each bundle from 8 square feet.

THE LITTLE yellow soybean has helped to lift the mortgage on many said-to-be rundown farms, and has also assisted in giving what most of us are after—higher standards of living for farm folks. It has accomplished much in the short span of years since it was accepted as a standard farm crop.

There are people who want to know why such a crop was not brought into general use at an earlier date. This might have prevented much of the financial grief and other woes experienced by farmers struggling to keep up the payments on so-called submarginal land. The development and acceptance of the soybean as a farm crop was an evolutionary process, and the apparent progress did not happen overnight.

Production and utilization of the soybean represents a spectacular advance for research carried out by experiment stations, U. S. Department of Agriculture, and industry. At present there are not many final answers to important questions; so we may expect continued progress and many changes in the future.

If we could disregard for a moment the sweat, the toil and disappointments which have gone into this development we might be justified in bursting forth with such terms as "supercolossal," "magnificent," "brilliant," and so on down the line. Products which are far less useful have been deluged with such praises and have left a lasting impression on the public because of the somewhat fantastic claims. Apparently the soybean will continue to give up its oil and protein without any waving of flags and blaring of trumpets.

Southern Illinois has been credited with having large areas of submarginal farm lands. It has been only a short time back, 20 years or more, that there were scarcely no grain elevators in this vast stretch of level farm lands. Today there are many country elevators within this area with new ones being constructed every year. Their storage bins rival in size and modern equipment those in the Illinois grain belt.

These southern Illinois elevators ship out millions of bushels of soybeans which are grown on flat gray soils and rolling yellow farm lands. In fact it is the soybean crop which brought about the need for more of these grain handling plants. The enormous total production upon these so-called submarginal farm lands is a credit to the alertness of the farmer, the tenacity of the research and extension workers, and a compliment to the cooperative ability of industrial agencies.

Country elevators are the pulse of farm progress and activity. A very excellent example of the business done in southern Illinois is that of the Farmer's Co-op Elevator at Patoka in Marion County. This plant is under the very able management of George J. Wasen. Mr. Wasen said, "In 1950, we shipped out 172 cars of soybeans, 61 cars of corn and 22 cars of wheat." The soybeans hand-

led amounted to more than double that of corn and wheat in a single year.

Mr. Wasen went on to say, "Only a few years back we took in scarcely no soybeans, now we handle more of them than all other crops."

Soils Need Treatment

These so-called temporary submarginal farm lands can be made to produce 30 bushels of soybeans an acre and such land is no longer submarginal. These soils need heavy applications of limestone, four to six tons an acre, also sufficient phosphate and especially potash. In addition to soil treatment and fertilization, there must be used high-yielding, adapted varieties, the best cultural methods and adequate machinery to handle the crop.

Mean Oil and Protein

We measure our yields and base costs and profits on bushels an acre. Actually we are producing oil and protein because the processor converts the beans directly into oil and soybean meal. The aim of every grower should be to produce 500 pounds of oil and 1000 pounds of protein an acre, and the processor should look to this as his guide also. This is by no means an impossible mark but is rather easily attained.

On the Newton experiment field located in southern Illinois, Jasper County, there were only 12 bushels of beans an acre harvested on land with no soil treatment. This low yield gave only 153 pounds of oil and 263 pounds of protein which is a long way from what we are aiming at.

Table 1. Soybeans: Yield, Oil and Protein Content Newton Experiment Field 1950

Soil Treatment	Beans bu./A	Oil %	Oil lbs.	Protein %	Protein lbs.
None	12	21.2	153	36.5	263
K	12	20.4	147	36.8	265
LK	23	20.9	288	41.0	566
LrPK	29	19.4	338	43.8	762

L limestone K muriate of potash rP rock phosphate.

Table 2. Soybeans: Yield and Oil Content Willow Hill Field 1948

Soil Treatment	Beans Bu./A	Oil %	Oil lbs.
LaPN	21	17.9	225
LaPNK 100 lbs.	29	18.9	329
LaPNK 200 lbs.	30	19.1	344
LaPNK 600 lbs.	34	19.8	404

L limestone sP superphosphate
N ammonium sulphate K muriate of potash

Table 3. Soybeans: Yield, Oil and Protein Content Clayton Experiment Field 1950

Soil Treatment	Beans bu./A.	Oil %	Oil lbs.	Protein %	Protein lbs.
None	28	20.0	336	40.6	682
LrPK	41	19.2	472	40.5	996

L limestone rP rock phosphate K muriate of potash

Where the land was limed and about 1000 pounds of rock phosphate added along with 200 pounds of muriate of potash, the bean yield was 29 bushels. With this yield the oil went up to 338 pounds and protein was 762 pounds an acre. This represents a rather encouraging advance toward the desired goal. (Table 1)

Limestone aids in the fixation of nitrogen by the soybean plant, and on light soils this raises the protein content of the beans. On the Newton field, land without lime produced soybeans as low as 36.5 percent protein; where lime was used the amount of protein was as high as 43.8 percent. (Table 1)

Potash fertilization usually increases the percentage of oil as well as the acre yield of soybeans. Due to seasonal conditions in 1950, the oil content was not increased as indicated in Table 1. Results in Table 2, Willow Hill field, show that the use of muriate of potash in 1948 increased both the yield and oil content of the beans. Without potash the percent of oil was 17.9 percent and where 100, 200 and 600 pounds of muriate of potash was used the oil was 18.9 percent, 19.1 percent and 19.8 percent respectively. It is good to have a high percentage of oil in beans but a few bushels in crease in acre yield helps in increasing the total amount of oil an acre. The Willow Hill field is also located in Jasper County and on the level gray soils characteristic of that county.

Soybeans have reached their highest level of production of oil and protein on dark colored Cornbelt soils. On the Clayton experiment field located in Adams County, Ill., soybeans on well treated (LrPK) land made 41 bushels an acre in 1950. These beans contained 472 pounds of oil and 996 pounds of protein. This was very close to the desired goal of 500 pounds of oil and 1000 pounds of protein. The variety of beans used in this field test was Hawkeye, a high-oil type. However, the season produced a high yield but failed in the production of a high percentage of oil as may be seen in Table 3.

INOCULATE SOY BEANS

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The Urbana Laboratories
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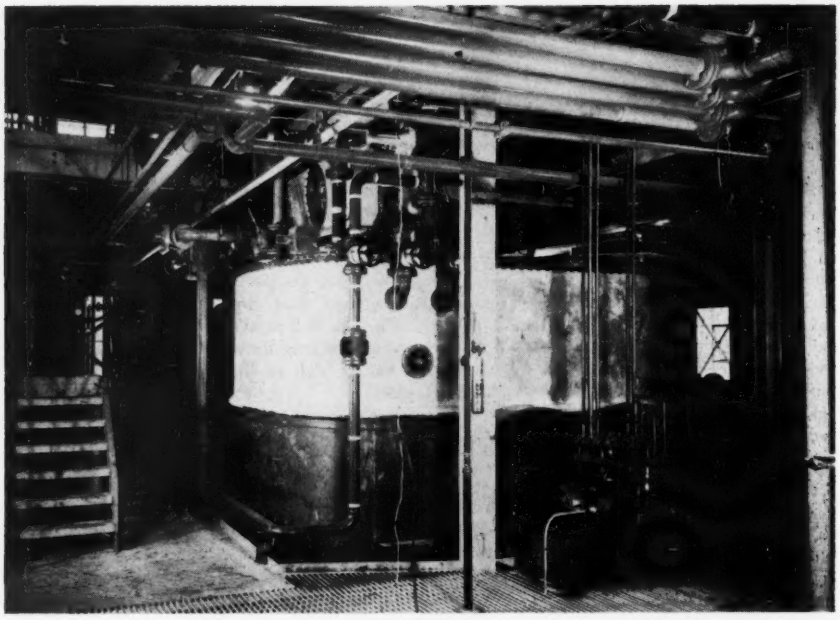


Five-story extraction tower of solvent plant.

Why Controlled Heat-Treatment IS NECESSARY *In Soybean Processing*

Proper processing grows more vital as soybean oil meal finds increasing usage in livestock rations

By FRED H. HAFNER
General Mills, Inc.

THE PURPOSE of this article is to present in simple words information relating to the effect of heat-treatment on the quality of soybean oil meal.

Soybeans in the raw or unprocessed state are made up of a variety of components, namely proteins, oil, sugars, minerals, cellulose-like compounds including fiber, a fatty material referred to as lecithin (abundant in egg yolk), enzymes (such as urease), vitamins, sterols and moisture.

Using the solvent hexane process we can separate these components into two major groups, as follows:

FRACTION I
Fatty Components
- Soybean oil
- Soybean lecithin
- Sterols (tocopherol, stigmasterol)
- Fat-soluble vitamins[1]
- Fat-soluble enzymes[2]

FRACTION II
Non-fat components
- Proteins
- Sugars
- Minerals
- Cellulose-like compounds
- Water-soluble vitamins[3]

Having effected the separation we can dispose of Fraction I and turn our attention to Fraction II. Here we have the fraction from which 44 percent protein extracted soybean oil meal is made.

As this high protein fraction comes from the extraction tower, it is still a raw product white in color and containing approximately 35 percent hexane by weight. The proteins are essentially in the same state as they existed in the raw, unprocessed soybeans. The enzymes and vitamins retain all their original activity. The sugars are raw, uncarmelized.

Even the flavor of the extracted flakes is raw and bitter to the extent that the flakes are unpalatable for feeding.

Before this high protein fraction can be shipped as soybean oil meal it must go through the following additional processing stages:

1—Removal of the hexane.

2—Cooking of the extracted, solvent-free flakes.

3—Cooling of the extracted, solvent-free flakes.

4—Grinding of the extracted, solvent-free flakes.

[1] Carotene, vitamins A and E.
[2] Lipase, an enzyme that causes breakdown of oil; carotene oxidase, an enzyme that destroys carotene.
[3] Thiamin, riboflavin, niacin, B-12, pantothenic acid, biotin.

5—Screening of the ground soybean protein.

6—Adjustment of moisture content, not to exceed 12 percent.

Of these six stages, stage No. 2—cooking of the extracted, solvent-free soybean flakes—is in my opinion the most important stage. During the cooking process the following objectives are accomplished:

1—Last minute traces of solvent are removed.

2—The raw bitter flavor of the extracted flakes is removed.

3—Color is developed by the process of carmelization.

4—Enzymes (and so-called enzyme inhibitors) are inactivated.

5—The proteins are altered to improve their growth promoting qualities.

Cooking of the extracted soybean flakes is usually accomplished in steam jacketed sectional cookers, each compartment being equipped with an agitator to keep the material from being over-cooked in localized areas. The extracted flakes are mixed with hot water and/or steam to obtain a certain pre-determined moisture content. The flakes pass through the cooker at a pre-determined rate. A temperature higher than the boiling point of water is maintained throughout the cooking process.

Another type of cooker employed by some processors cooks the flakes under pressure. The resulting meal is essentially the same as meal produced in atmospheric cookers.

Heat Sensitive

From a nutritionist's viewpoint, the changes that are effected in the proteins during the cooking process are of utmost importance. Experience has taught us to realize how sensitive to heat the proteins of the soybean are. The value of any extracted soybean oil meal as an ingredient of feeds for poultry, swine, dogs and calves is dependent on the treatment the extracted flakes receive during the cooking process. Unless exacting control is maintained over the cooking process on an around-the-clock basis, uniform quality is unobtainable even if the operators of the equipment have the necessary know-how and even if the necessary equipment controls are provided.

Two of the reasons why controlled heat-treatment of the extracted soybean flakes in the cookers is necessary are presented herewith. The reasons presented are based on results of research studies conducted by leading biochemical and nutritional authorities.

No. 1. To avoid overheating which is detrimental to proteins such as those found in soybean oil meal.

Overheating brings about a reaction between the proteins and the sugars in the extracted soybean flakes. Certain parts of the proteins join hands so-to-speak with certain parts of the sugars to form a union that resists breakdown during the normal processes of digestion within an animal. This union of sugars and proteins prevents the animal from making full use of all parts of the protein. As a result, even though the animal consumed the proper quantity of feed, the low quality of the soybean oil meal in the feed would deprive the animal of certain protein components essential for growth.

No. 2. To avoid production of underheated extracted flakes.

Extracted soybean flakes require thorough controlled cooking; otherwise the full value of the proteins for growth will not be realized when fed to poultry, swine, dogs or calves. The exact cause for the poor value of the proteins in undercooked soybean oil meal is not known. However there is abundant evidence reported in the literature to indicate the "lower availability of the proteins" probably is related to:

a—Resistance of the proteins to digestion.

b—Binding of parts of the proteins to sugars.

c—The existence of a substance in the soybean oil meal that interferes with the enzymes in the digestive tract of animals. (The substance is sometimes referred to as a proteolytic inhibitor or an anti-enzyme.)

Let us consider each of these factors separately.

a—*Resistance to digestion.*

If the proteins in undercooked soybean oil meal resist digestion the proteins tend to pass through the digestive system of an animal too fast to be completely absorbed and utilized. However, there is ample evidence to prove that whereas the digestibility of the proteins in soybean oil meal is improved by cooking, the improvement is not great enough to account for the increased nutritional quality of the proteins. Why then are the proteins in an undercooked soybean oil meal of lower nutritional quality due to slower digestion than the proteins in a completely cooked soybean oil meal?

Let us use as an example of point the person who eats a sirloin steak at noon, one-half hour later eats the onions, one-half hour later takes the salt and one-half hour later consumes the steak sauce. One can immediately sense that the effectiveness of the combination is lost when the components of a good steak dinner are consumed at intervals instead of simultaneously.

FRED H. HAFNER

So it is with proteins, such as those of undercooked soybean oil meal that resist digestion. At the fore (proximal) part of the digestive tract those parts of the proteins that are least resistant to digestion are released and absorbed into the blood stream. At the middle part of the digestive tract, after a longer time interval, those parts of the proteins that are moderately resistant to digestion are released and absorbed into the blood stream. At the aft (distal) part of the digestive tract, after still a longer time interval, those parts of the proteins that are highly resistant to digestion are released in part and absorbed into the blood stream.

For Rapid Digestion

However, for the most effective use of the proteins, the various parts that are digested should be available at relatively the same time. If they are not, their effectiveness is partially or completely lost. The objective then is to so alter the proteins that all parts are digested rapidly and simultaneously in the digestive tract of the animals. Controlled cooking during processing of the extracted soybean flakes seems to accomplish this.

b—*Binding of proteins to sugars.*

We have already discussed the tendency for the proteins and sugars in extracted soybean flakes to combine when the flakes are overcooked. There is evidence to indicate that analagous combinations are naturally present in the raw or undercooked product, combinations which prevent complete utilization of all parts of the proteins

by animals. These combinations of proteins with sugars, and possibly other non-protein materials of the soybean, apparently are broken down during the cooking process releasing the proteins so that they can be readily digested and effectively utilized by the animals.

This of course presumes the cooking will not be excessive which would again result in the proteins combining with the sugars to form products that could not be effectively utilized.

c—*Proteolytic Inhibitors.*

Usage by Animal

A large part of the vegetable and animal matter in feeds is converted in the digestive tract (mouth, stomach, duodenum, intestines) to materials that can be absorbed into the blood stream of the animal. This conversion is accomplished by means of *enzymes* which themselves are part protein in structure. For example:

Starch is converted to sugar by starch-splitting enzymes.

Fats are converted to fatty acids and glycerine by fat-splitting enzymes.

Proteins are converted to amino acids and polypeptides by protein-splitting enzymes.

In other words, enzymes are a part of normal body function. If one of the ingredients of a feed should contain substances that would interfere with any of these enzyme functions, the digestive process of the animal would be upset to the extent that it would not derive full value from its feed. Soybeans in the raw or undercooked stage contain substances that are referred to as enzyme inhibitors. Some of these substances interfere with the normal function of the enzymes that convert proteins to amino acids and polypeptides (both amino acids and polypeptides being compounds that when combined according to definite patterns, form proteins).

Fortunately these substances which interfere with the function of the proteolytic enzymes can be inactivated by heating in the presence of water. This is exactly what happens in the cooking process when the process is carefully controlled. The resulting soybean oil meal contains little or none of the substances that interfere with normal enzyme activity in the digestion process.

Ten years ago when the level of soybean oil meal in a feed was 5 percent or less, the matter of protein quality of soybean oil meal had a lesser significance than it does today.

Many feeds now carry 20 percent to 30 percent or more of soybean oil meal. Therefore it is extremely important that soybean oil meal of highest possible quality be used in a feed. If every feed mixer would act in accordance with the following reminder: "I cannot afford to run the risk of sacrificing quality in my finished feed by using soybean oil meal of questionable quality as an ingredient," I am sure that in time soybean oil meals of questionable quality would disappear from the market and only quality products would be available.

I hope this review serves to clarify the reason why controlled heat-treatment is necessary in the processing of soybeans to obtain high quality extracted soybean oil meal.

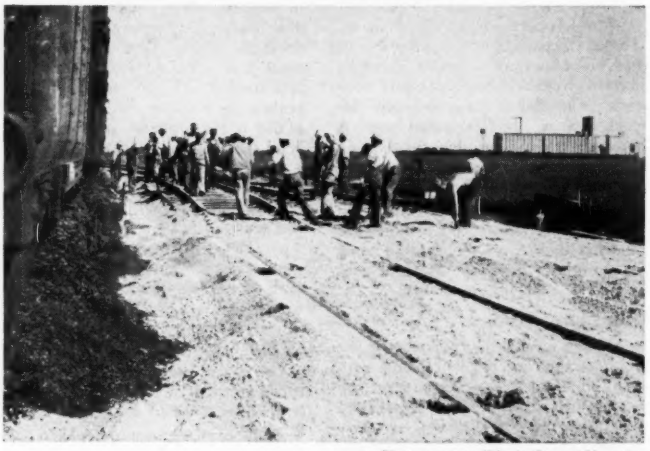
GRAIN MERCHANTS MEET

The annual meeting of the Chicago Association of Grain Commission Merchants was held Jan. 28 at which time the following officers were selected: Robert H. Gardner, president; Orville O'Neal, vice president; K. V. R. Nicol, secretary; and Royal W. Bell, treasurer.

Directors, in addition to the four above named officers who also serve in that capacity, who were selected at the same time, are: Jack A. Benjamin, Joseph Fagan, Thomas E. Hosty, Sr., Richard L. Kennedy, Jr., and Henry Steffany.

The Chicago Association of Grain Commission Merchants sponsors the Grain Exchange Institute.

Rush Decatur Line for Soy Harvest



—Photo courtesy Illinois Central Magazine

Illinois Central workmen spread ballast on these three tracks leading into Decatur, Ill., which were rushed to completion in advance of last fall's soybean harvest. Beyond the soybean field you see the processing plant of Archer-Daniels-Midland Co.

Railroads play a vital part in the soybean harvest. Here workmen on the Illinois Central Railroad last summer rushed to completion three additional 90-car tracks at Decatur, Ill., to facilitate handling of soybeans into the city during the harvest season.

This was part of a half-million-dollar improvement program by the IC to speed up shipments in and out of Decatur, the "soybean capital of the world."

Bordering the track you see a soybean field, and in the background the huge soybean processing plant of Archer - Daniels - Midland Co. But ADM is only one of five big processors in Decatur. Others are A. E. Staley Manufacturing Co., Spencer Kellogg & Sons, Inc., Decatur Soy Products Co., and Shellabarger Mills, Inc., which has recently added a new plant.

Located in the heart of the rich corn and soybean area of central Illinois, this industrial and commercial city of 67,000 is the hub of rail systems whose tracks radiate in 15 separate directions from the city. The Illinois Central is one of five railroads serving Decatur and interchanges with all of them. In freight revenue, the city ranks among the top 10 leaders on the Illinois Central.

NEW WORLD RECORD IN FATS PRODUCTION

World production in 1951 of the principal fats, oils, and oilseeds—all in terms of fat and oil—is estimated at a record 25,850,000 short tons, reports USDA's Foreign Crops and Markets. This is an increase of nearly 2 million tons from 1950, or 8 nounced.

Compared with prewar, world production is indicated to be up 13 percent. For the first time since the war, output of fats and oils was sufficiently great to restore the world's per capita supply to approximately the prewar level.

The restoration of per capita supply to about the prewar level is perhaps the most significant development of recent years. However, world trade in 1951 remained below prewar and may decline slightly in 1952. The estimated trade for 1951 is 6,290,000 tons compared with 6,537,000 prewar and a tentative forecast of around 6 million tons for 1952.

Edible vegetable oils, estimated at 8,955,000 tons, represent slightly more than one-third of the total 1951 production. And this group of oils accounts for the bulk of the increase in total world production compared with 1950—mainly as the result of the Mediterranean olive oil output which is up 870,000 tons from 1950.

Other important increases are cottonseed oil and sunflower seed oil. The United States accounts for most of the cottonseed oil increase of some 300,000 tons. Sunflower seed oil is up sharply, largely because of expanded production in Argentina.

Total production of *palm oils* is estimated at 3,980,000 tons, up 7 percent from 1950 and 10 percent above prewar. The increase here is entirely in coconut oil and resulted from a sharply expanded output of copra in Indonesia, and to a lesser extent to increases in the Philippines and Ceylon.

Industrial oils are estimated at 3,115,000 tons for 1951—down slightly from 1949 and 1950 but 7 percent above prewar. Linseed oil, however, which accounts for most of the recent decrease in this group, was below prewar in 1951. The smaller output is explained mainly by a sharp reduction in Argentina's flaxseed crop, and a substantial reduction in the United States.

FOOD PROGRAM AT MIT

A special program in food technology will be offered at the Massachusetts Institute of Technology, Cambridge, Mass., during the 1952 summer session from June 16 to July 3, the Institute has announced.

The course is planned to enable people in the food industry to study developments in food manufacture and control. Food origin and composition will be discussed, as well as processing, handling, transportation, storage and control.

There will be opportunities for group visits to representative companies in the Boston area. Members of the MIT faculty and research staff will take part in the program.

For information write Professor Bernard E. Proctor, department of food technology, Massachusetts Institute of Technology, Cambridge 39, Mass.

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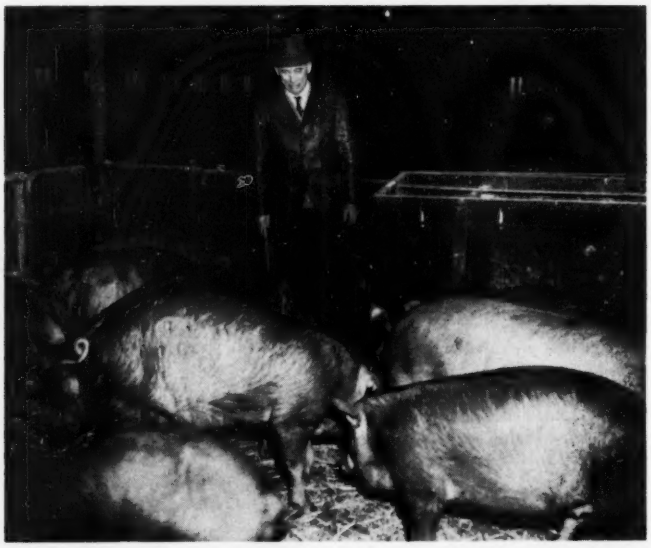
Pioneered Tests with Meal

Robison of Ohio Began Experimenting with Soybean Oil Meal in Hog Feeding 35 Years Ago, Has Run Tests on Over 3,000 Hogs.



W. L. Robison and a group of experimental pigs on a ration of corn, dried distillers' grain solubles, soybean oil meal, ground alfalfa, minerals and vitamin B-12 and antibiotic supplement. The ration contained no high-protein feed of animal origin. The pigs were started on the experiment when they averaged 50 pounds in weight, and were carried to a final average of 217 pounds. They gained 1.83 pounds daily and required 343.34 pounds of feed per 100 pounds of gain. They were ready for market at 162 days of age.

Research for new and better ways of using agricultural by-products is an ever continuing process. Work with soybean oil meal for growing and fattening pig rations has been in progress at the Ohio Agricultural Experiment Station since 1916 when W. L. Robison, in charge of swine investigations, started a test with an expeller-type meal.

The volume of soybean oil meal used for feeding in the United States has increased from a trial basis in 1916 to over five and one-half million tons in 1950. This has resulted not only from research in ways to feed the meal to better advantage but also from improved ways of processing, new uses for soybean oil and the increased production of beans from new, high yielding varieties.

The first meals tested were made by the expeller process in the cottonseed oil meal plants in the Southern states, says Robison, The Havens Oil Co. of Washington, N. C., and the Eastern Cotton Oil Co., Norfolk, Va., furnished the first meals tested in 1916. These meals gave considerably better results as swine rations than raw beans used as check rations.

The second year of the tests, an imported meal secured from the Obrian Milling Co., Greenville, Ohio, was used. This meal gave no better results than raw beans. Since that time these and many other companies have cooperated in furnishing various types of meals for experimental work.

Different Processes

Contrasting results with these meals during the first two years' tests raised the question—were differences in the processing of the meals influencing the efficiency of their use by swine? The Anderson Expeller Co., manufacturers of processing equipment, cooperated in manufacturing different lots of expeller-type meals under various temperature and moisture conditions. Manufacturers of hydraulic and solvent extracted meals also cooperated in making meals under different conditions in an attempt to increase the efficiency of use of meals by swine. These tests indicated the meals that were heated to sufficiently high temperature in the processing gave much better results than meals that were not heated. These favorable results were caused by the breakdown of what is now known as the antitrypsin enzyme, which inhibited the use of the protein in the meals.

Robison conducted 42 dry lot and 12 pasture experiments in the period between 1916 and 1950. These contained 291 groups or a total of 3,269 pigs. Objectives of the tests were to secure information on the relative values of soybean oil meal alone or in mixtures with other high-protein feeds and to find ways of increasing the effectiveness of soybean oil meal as a supplement to corn for pigs.

In most tests, ground shelled corn was fed and the rations were mixed to contain equivalent amounts of total protein regardless of the high-protein feeds used. Sufficient minerals were added to make the total mineral content of the rations approximately the same.

Pigs in the dry lot experiments were kept indoors. From 1926 on, green, leafy, third-cutting ground alfalfa was used to make up from 4 to 5 percent of the dry lot rations. Starting in 1942, 0.01 percent of irradiated yeast was used in the dry lot rations as a source of vitamin D.

The dry lot basal ration commonly used was one of corn, soybean oil

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meal, ground alfalfa, minerals, and irradiated yeast. The subnormal performance and the morbidity of some of the pigs indicated that this ration was deficient in one or more respects.

Additions to Ration

Different materials were added to the basal ration in efforts to improve it for dry lot feeding. Among the materials tested were (1) oats, (2) cottonseed meal and a linseed and cottonseed meal mixture, or other high-protein feeds of plant origin, (3) a larger amount of ground alfalfa during the growing period, (4) legume silage, (5) methionine, (6) lysine, (7) high-protein feeds of animal origin, (8) dried brewers' yeast, (9) yeast grown in the wet feed, (10) condensed fish solubles, (11) dried distillers' grain solubles, (12) the trace mineral, cobalt, (13) a vitamin B-12 supplement, and (14) a concentrate containing both vitamin B-12 and residues of the antibiotic aureomycin.

Oats, cottonseed meal or a mixture of linseed and cottonseed meal in the ration were slightly beneficial but did not overcome the deficiency. Neither did the addition of 0.2 percent synthetic methionine nor 0.2 percent synthetic lysine improve the ration.

Ground alfalfa at a 15 percent level showed no better results with the soybean-oil-meal ration than the same alfalfa fed at a 5 percent level. The alfalfa meal used in this particular experiment was of relatively poor quality. It was the only commercial meal used in the experiments. Other tests have indicated that a high level of good quality alfalfa will correct the deficiency of a soybean-oil-meal ration. However, above a 4 or 5 percent level, as the alfalfa is increased the rapidity of the gains decrease. This is because of the fiber present or the bulky character of the alfalfa.

There was some improvement in the ration by substituting fish meal, tankage or meat scraps for a part of the soybean oil meal. Including dried brewers' yeast, condensed fish solubles, or dried distillers' grain solubles, or adding water and growing yeast in the wet feed for 24 hours also increased the effectiveness of the soybean-oil-meal ration. These supply water soluble or B-complex vitamins. Yeast and dried distillers' grain solubles, however, are low in vitamin B-12.

The use of a vitamin B-12 supplement with the basal ration definitely improved the appetite, rate of growth and health of the pigs. A combination of the vitamin B-12 supplement and dried distillers' grain solubles gave better results than either alone or than meat scraps with the ration. When dried distillers' grain solubles were added to the basal ration and a comparison of the vitamin B-12 supplement was made with meat scraps, the vitamin B-12 produced faster gains but no greater gains per unit of feed than the meat scraps.

When a B-12 and antibiotic supplement and the dried distillers' grain solubles were added to the basal ration, the additional vitamin B-12 gave both faster and more efficient gains than when meat scraps were used with the dried distillers' grain solubles and vitamin B-12.

Results from these dry lot feeding tests have indicated that for best results using soybean oil meal as a protein supplement to corn, pigs need a B-12 and antibiotic supplement and some source of vitamins of the B-complex in addition to the basal ration of corn, soybean oil meal, alfalfa, minerals and irradiated yeast.

For pigs fed on good quality pasture, tests at the Ohio Station were made on Dwarf Essex rape or on a mixture of alfalfa and medium red clover, and it was found that soybean oil meal was as effective a supplement to corn as meat scraps, tankage or mixtures of high protein feeds when the ration included a mineral mixture of salt, limestone, bone meal and ferrous sulphate.

Detailed reports of the experiments carried on by Robison during the past years are given in his latest bulletin, published by the Ohio Agricultural Experiment Station. This publication, Research Bulletin 699, Soybean Oil Meal for Pigs, may be obtained by writing the Mailing Room, Ohio Agricultural Experiment Station, Wooster, Ohio.

In 1947, W. L. Robison received the Morrison Award, given by the American Society of Animal Production in recognition of his outstanding research in the field of animal production, both in field of nutrition and breeding of swine.

He was raised on a farm in Johnson County, Ind. He attended Purdue University and received his BS in Agriculture in 1915. He came to the Ohio Agricultural Experiment Station in the fall of 1915 and received his MS in nutrition and genetics from Ohio State University in 1918.

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PURINA ADDS TWO SOLVENT PLANTS

Donald Danforth, president of Ralston Purina Co., St. Louis, Mo., announced Feb. 23 that his firm will construct a new soybean solvent processing plant at Kansas City, Mo., according to the Associated Press.

At the same time Danforth announced the purchase by his firm of Shellabarger Mills, Inc., which he said owns a newly constructed solvent plant at Decatur, Ill.

The Kansas City installation will be built at the site of the firm's present expeller plant which is a part of the company's Kansas City chow mill.

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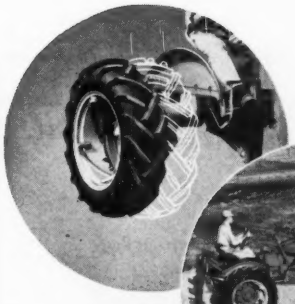

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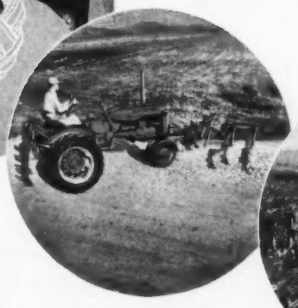

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Second Ontario Convention Is Held

A capacity crowd of about 350 persons attended the second annual Ontario Soybean Convention held in Chatham Feb. 20. The convention was sponsored by the Ontario Soybean Marketing Board and the Farm Products Marketing Board of Ontario.

Harry Pugh, Chatham, chairman of the Ontario Soybean Marketing Board, served as chairman of the meetings, and was in charge of arrangements, assisted by Ken Standing, Essex, secretary of the board.

The morning program was devoted to reports of experiments and research on soybeans at the different experimental stations in the Ontario area. Included were a report from A. W. Owen of the Harrow Experimental Station; one from Dr. F. Dimmock of the Ontario Department of Agriculture at Ottawa, covering the experimental work there; a report on the work at Guelph by George Jones of the Ontario Agricultural College; a report on the agronomic work with soybeans being done by the agronomy department of Victory Mills; and a report on the insect and disease studies being conducted at Harrow by Dr. A. A. Hildebrand.

The banquet program consisted of a group of numbers by a bagpipe band, and a talk by Geo. M. Strayer, secretary of the American Soybean Association and editor of the Soybean Digest. His subject was "The Trend of Soybean Prices."

The afternoon program consisted of a presentation on soybean production and culture by Ivan Roberts, head of the agronomy work for Victory Mills, Ltd., and a discussion of the industrial uses of soybeans and soybean products by Dr. Parker, head of the Victory Mills laboratory at Toronto.

As the door prize one bushel of the new Harrow soybeans, a variety being introduced by the Harrow Experimental Station, was donated by R. H. Peck, River Canard.

—s b d—

Please be sure to mention the Soybean Digest when writing to our advertisers.

TO DELPHOS FIRM

PAUL V. METZNER

Paul V. Metzner has joined the office force of the Delphos Grain & Soya Products Co., Delphos, Ohio, as assistant traffic manager and assistant in the grain buying department. This is a new position created to handle the increased volume of grain processed by the Delphos plant.

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Processors at Purdue Mar. 25-26

The fourth annual tri-state conference of processors and agronomists from Illinois, Indiana and Ohio will be held at Purdue University Mar. 25 and 26, K. E. Beeson, chairman of the program committee, has announced.

The program will be held in the West Faculty Lounge of the Purdue Memorial Union in West Lafayette, Ind.

The conference will open with a 6:30 p. m. dinner at the Purdue Union Mar. 25, and there will be morning and afternoon sessions the following day. Dinner speaker will be J. B. Peterson, head of the Purdue agronomy department.

Mar. 26 speakers and their topics:

"Research Work on Soybean Oil Meal in Progress at Purdue," W. M. Beeson, Purdue animal husbandry department.

"New Soybean Varieties in the Midwest," A. H. Probst, USDA and Purdue agronomist.

"Soybeans in the South," D. A. Hinkle, head of the agronomy department, University of Arkansas, Fayetteville, Ark.

"Chemical Weed Control and Defoliation in Soybeans," a panel discussion with J. C. Hackleman, extension agronomist of the University of Illinois, Urbana, Ill., as moderator.

"Conventional Weed Control and Resulting Problems," Chester B. Biddle, president of the American Soybean Association, Remington, Ind.

"Purdue Research," O. C. Lee, Purdue botany and plant pathology department.

"Ohio Research," C. J. Willard, agronomy department, Ohio State University, Columbus, Ohio.

"Illinois Research," Fred Slife, agronomy department, University of Illinois, Urbana, Ill.

"U. S. Regional Soybean Laboratory Research," J. L. Cartter, director of the Laboratory, Urbana, Ill.

"Soybean Oil Meal," a panel discussion on the ratio of the utilization of soybean oil meal to corn and roughage for several classes of livestock, with Donald Paarlberg, Purdue agricultural economics department; C. W. Carrick, Purdue poultry department; W. M. Beeson, Purdue animal husbandry department; and N. S. Lundquist of the Purdue dairy department.

Those who plan to attend the conference are asked to make their reservations directly with the Purdue Memorial Union, the Fowler Hotel, the Cedar Crest Motel or the Morris Bryant Motel, all at Lafayette, Ind.

Program committee consists of Beeson, J. Ward Calland, R. G. Houghtlin, J. B. Peterson and A. H. Probst.

MANAGES G-M PLANT

Dr. William B. Brown has been appointed manager of General Mills' chemical plant at Kankakee, Ill., Whitney H. Eastman, president of the company's chemical division, announced.

Dr. Brown was formerly plant manager for the Pittsburgh Coke and Chemical Co. at Pittsburgh, Pa. In his new position, he will be responsible for production of General Mills' fatty

WILLIAM B. BROWN

acids, polyamide resins and other organic chemicals.

Dr. Brown holds a bachelor of science degree in chemistry and a doctor of philosophy degree in organic chemistry from New York University. He has also studied at the University of Munich, Germany, and at the Carnegie Institute of Technology.

He joined the Pittsburgh Coke and Chemical Co. in 1942, serving successively as assistant director of research, director of research and development, manager of chemical development, general superintendent and plant manager. During his 10 years with the firm, he directed the development of processes and the construction of plants for producing phthalic anhydride, alpha naphthylamine, 2,4-dichlorphenol, 2-4D, 2-4D esters, benzene hexachloride, parathion, nitrocresol, quaternary ammonium salts and phthalic ester plasticizers.

From 1936 until 1942, Dr. Brown served with the Barrett Co., first as research chemist, later as research group leader.

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- **Delivered, as pictured, to any schedule.**
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USDA CONCERNED WITH TREND TO SYNTHETICS

The U. S. Department of Agriculture is concerned about the raw material situation for the soap industry because too little of the principal raw materials of the soap industry, fats and oils, are being used, Robert M. Walsh, deputy director of the fats and oils branch, USDA, told the recent convention of the American Soap and Glycerine Producers.

Consumption of soap has fallen by six or seven pounds per person since 1948, said Walsh. At the same time, retail sales of synthetic detergents, made principally from petroleum products, have risen by about five pounds per person, more than doubling during the period.

It is clear that several hundred million pounds of fats and oils have been displaced in the soap industry by the meteoric rise of synthetic detergents, only a small part of which employ fat derivatives as raw material. About half of the displacement of fats and oils in soap appears to have occurred in tallow and greases. The remainder has taken place mainly in palm oil, fish oils, and the lauric acid oils—coconut, palm-kernel, and babassu.

Fats and oils as raw materials for soap manufacture promise to be in ample supply for most of 1952. The disturbing factor from agriculture's point of view is the declining trend in demand for fat-based soaps, resulting from the growth in use of synthetic detergents based largely on petroleum raw materials.

The consumer's preference for improved performance of detergents, whatever the source of raw materials, is understandable. Fats and oils in the past have been of prime importance in this field. Today the interests of the consumer, the soap industry, and agricultural producers will be well served if the soap industry would give careful consideration, through research and commercial trial, to the problem of adapting agricultural materials, such as tallows and greases and their derivatives, to improved performance in soap and synthetic detergents.

JOIN BUFFALO FIRM

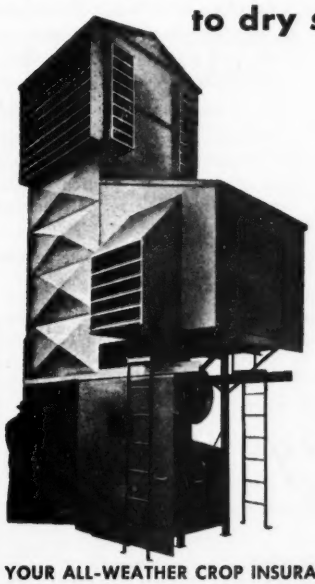
TRUMPLER JOHNSTON

Niagara Filter Corp. of Buffalo, N. Y., has named Arthur W. Johnston as sales manager and Alfred L. Trumpler as advertising manager and assistant sales manager.

Johnston was formerly with the Buflovak division of Blaw-Knox Co. Prior to that he was with Worthington Pump and Machinery Corp.

Trumpler returns to his former post as ad manager at Niagara after a year with Bell Aircraft Corp. Both appointments are part of a new program of expansion planned by the Buffalo firm.

now there's a **NEW WAY** to dry *small batches*



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For full details on this new Economy "10" SHANZER DRIER write, wire or phone today to H. M. Shanzer Company.

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SOYBEAN SHIPMENTS FROM THE FAR EAST

No bulk cargos of soybeans originating from China or Manchuria transited the Suez Canal during Nov.-Dec. 1951, according to the latest report from Port Said, states Foreign Crops and Markets.

Total (revised) northbound bulk soybean shipments through this waterway during 1951 were 524,063 short tons, or 17,468,770 bushels. In addition, a bulk cargo of 7,535 tons of soybean oil (equivalent to 50,235 tons or 1,674,500 bushels of beans) passed through the Canal during Feb. 1951. Thus, on a combined basis these bulk shipments accounted for 574,298 tons or 19,143,270 bushels of soybean equivalent.

In all, 52 cargos of soybeans passed through the Canal during 1951. Of these, 43 originated from the South Manchurian port of Dairen, and the other shipments originated from the ports of Chinwagtao (5), Vladivostok (2), Chefoo (1), and Bahrein (1). A monthly breakdown of bulk soybean shipments through the Canal during 1951 is shown below:

Month	No. of cargos	Short tons
January	8	77,808
February	4	33,404
March	1	10,913
April	5	53,170
May	6	63,032
June	9	101,486
July	12	128,244
August	5	40,827
September	—	—
October	2	15,179
November	—	—
December	—	—
Total	52	524,063

The foregoing data represent only soybeans which transited the Canal in bulk cargos. It is known that soybeans and oil were also shipped with other cargos but the records for such freight could not be obtained at Port Said.

LECITHIN DIVISION

The formation of a Superior lecithin sales division to handle the marketing of Superior Soya Lecithin was announced by Meyer W. Budman, sales manager of Superior Materials, Inc., 120 Liberty St., New York City. Budman stated that shipments are being made of various grades of high quality refined lecithin.

Among other uses, this product is used for easy wetting and dispersion of pigments, for counteracting sagging and adjusting viscosity, and for improved package stability.

Superior Materials, Inc., has been selling chemicals and raw materials to the paint, ink, adhesive and allied industries for the past seven years. It is the Eastern sales representative for Edgar Brothers Co. and has introduced A.S.P. pigments on a large scale.

—sbd—

ASA MEN HONORED

Two well-known members of the American Soybean Association have been given Certificate of Distinction Awards for service in agriculture by the Purdue Agricultural Alumni Association. They are J. B. Edmondson, Danville, Ind., for many years a director of ASA, and formerly secretary, treasurer and vice president; and J. A. McCarty, J. A. McCarty Seed Co., Evansville, Ind.

Edmondson, whose long years of work with the American Soybean Association are well-known, at one time was president of the Mid-State Soybean Association. He did a great deal of work promoting Dunfield soybeans and other certified seeds. In 1949 he was elected president of the Indiana Corn Growers Association.

McCarty is now one of the most extensive handlers of soybean and popcorn seeds and horticultural equipment in Indiana. He has been connected with Purdue University activities and the Indiana Corn Growers Association.

The Certificate of Distinction Award is the highest award given by the Purdue Agricultural Alumni Association.

—sbd—

ANDREWS ADVANCED

SEWALL D. ANDREWS

Appointment of Sewall D. Andrews as general manager of the chemical division of General Mills, Inc., Minneapolis, Minn., was announced by Whitney Eastman, division president.

Andrews, who has served as director of sales, will continue to head that activity and in addition will assume responsibility for all chemical division operations.

Andrews is a 20-year veteran with General Mills.

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The ESSMUELLER Company
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Protects your soybean seed from rot and decay; from storage insects, too, with Spergon-DDT.

Results: Sturdier plants—a greater yield of soybeans.

Advantages: Effective at economical dosages, safe on seed, easy to use, compatible with legume inoculants and most insecticides, relatively low cost per unit of seed treated.

Write for free "seed protectant" Bulletin #1 including latest seed treatment chart.

UNITED STATES RUBBER COMPANY
Naugatuck Chemical Division, Naugatuck, Conn.

manufacturers of seed protectants—Spergon, Spergon-DDT, Spergon-SL, Spergon-DDT-SL, Phygon Seed Protectant, Phygon Naugets, Phygon-XL-DDT, Thiram Naugets—fungicides—Spergon Wettable, Phygon-XL—insecticides—Synklor-48-E, Synklor-50-W—fungicide-insecticides—Spergon Gladiolus Dust, Phygon Rose Dust—miticides—Aramite.

PUBLICATIONS

Most Processors Locate Near Crop

From the beginning, soybean processing plants have tended to locate near the source of raw materials, notes Earl C. Hedlund in his study on the Transportation Economics of the Soybean Processing Industry, recently published by the University of Illinois Press.

The study in its original form was submitted as a doctoral dissertation at the University.

"Illinois is the center of both the soybean production and processing industries," states Hedlund. "It is noted that there is a tendency of the soybean processing plants in Iowa and some of the fringe states to be of smaller capacity than those in Illinois. The less the intensity of soybean production, the greater the degree of decentralization in the processing industry. Soybean processing seems to be both a small-scale, local business and a large-scale, centralized operation.

"Soybean processing capacity is greater than is needed to handle the current commercial soybean crop, or that expected in the immediate future. Some plants in the soybean belt have already sharply curtailed or ceased operations. There are indications that competition among processors for the available supply of soybeans will become increasingly keen. Since the large-scale operators have lower per unit costs, it is likely that the smaller plants may be forced out of business unless local sale and freight rate differentials give them sufficient protection. The adaptation of the solvent extraction process to small-scale operation may be a boon to the smaller plants.

"Rail transport, with its transit privilege, is the central transportation feature of plant location in the soybean processing industry.

"In general, transit in soybean processing allows for the reaching of widely scattered markets for joint products of soybeans from a centrally located plant at a minimum of total transport cost; encourages large-scale plant operation; and reduces transportation costs to the shipper.

"On the other hand, it is discriminatory; it is a force tending to equalize competition and geographic advantage; it allows for a great deal of wasteful transportation; and it does not appear to be remunerative to the carriers.

"The weight lost in processing soybeans favors plant location in the raw material area. The nonapplication of transit to oil favors processing at the oil markets."

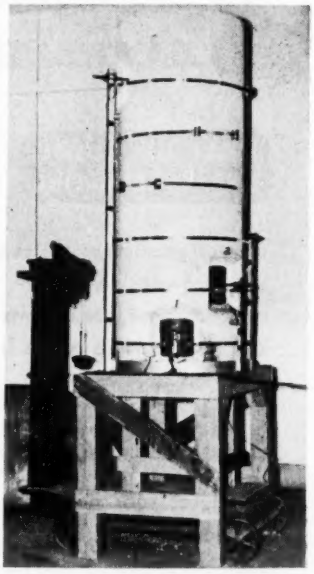
THE TRANSPORTATION ECONOMICS OF THE SOYBEAN PROCESSING INDUSTRY. By Earl C. Hedlund. University of Illinois Press, Urbana, Ill. 190 pages. Paper cover $2. Cloth cover $3.

Study Bin Pressures

Lateral and vertical pressures of soybeans and other materials are two important points that have to be considered in the building of storage structures.

These have been determined in experiments at Iowa State College and are reported in a bulletin issued by the Iowa Engineering Experiment Station.

The ratio of lateral to vertical pressure (a constant used in the design of deep grain bins) was obtained



Concrete bin used in tests of pressures of soybeans and other materials at Iowa State College.

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for wheat, shelled corn, soybeans, cement, sand and pea gravel.

Most designers in the United States use equations developed in Germany by Janssen in 1895 to determine the vertical and lateral pressures in deep bins.

Shelled corn, soybeans, sand and pea gravel do not follow Janssen's theory, the authors say. But they have worked out values that yield safe results.

LATERAL AND VERTICAL PRESSURE OF GRANULAR MATERIAL IN DEEP BINS. By Robert A. Caughey, Calvin W. Tooles and Alfred C. Scheer. Iowa Engineering Experiment Station Bulletin 172, 1951. 36 pages. Ames, Iowa.

USDA Patents

The Bureau of Agricultural and Industrial Chemistry of the U. S. Department of Agriculture has issued a list of patents held by the department.

These include a considerable number of inventions employing soy products or for use in processing such as:

A crown closure employing soy protein, a protein base coating composition for paper, aqueous dispersions of hardened or tanned protein salts, a soy whip, still and decanter for the recovery of products from alcoholic solutions of oleaginous materials, thermoplastic protein material, protein plastic molding compound, a process for producing protein plastics, aqueous dispersions of hardened protein, vegetable protein hydrates, and a process to produce a stabilized protein formaldehyde dispersion.

INVENTIONS FOR INDUSTRY. NEW PROCESSES AND PRODUCTS FROM AGRICULTURAL SOURCES. Patents of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture, Washington 25, D. C. Agricultural Information Bulletin No. 20, Oct. 1951.

Miscellaneous

TILTH OF CORNBELT SOILS CANNOT BE MAINTAINED WITHOUT LEGUMES AND GRASSES. By R. S. Stauffer, associate professor of soil physics. Circular 655. University of Illinois, Urbana, Ill.

Author says many of Cornbelt soils have been growing corn, soybeans and small grains year after year. He urges adoption of rotations including grasses and deep-rooted legumes.

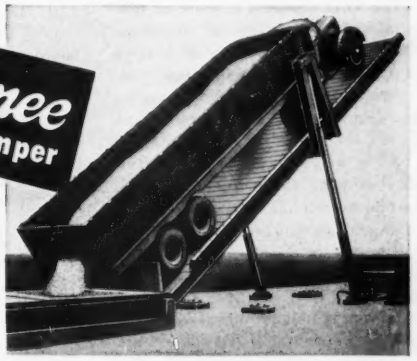
THE GROWTH-PROMOTING EFFECTS OF VARIOUS ANTIBIOTICS ON PIGS. By R. W. Luecke, F. Thorp, Jr., H. W. Newland and W. N. McMillen, Michigan State College, East Lansing, Mich. Journal of Animal Science, Vol. 10, May 1951.

The effect of various B vitamins on the growth-promoting properties of streptomycin on pigs, and also a study of the growth-promoting effects of aureomycin, penicillin and neomycin.

BROILER GROWING CAN BE PROFITABLE. By George F. Godfrey, R. H. Thayer and R. B. Thompson. Bulletin No. B-365, Feb. 1951. Oklahoma Agricultural Experiment Station, Stillwater, Okla.

BROILER PRODUCTION IN OKLAHOMA. By H. G. Ware and C. V. Phagan. Circular 555. Oklahoma A & M College, Stillwater, Okla.

Kewanee Hydraulic Dumper



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- Sizes—40′, 45′ and 50′ Platforms. Other sizes special.
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- TWIN Hydraulic Power Units.
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This New KEWANEE Pitless Model cuts foundation costs to a minimum.

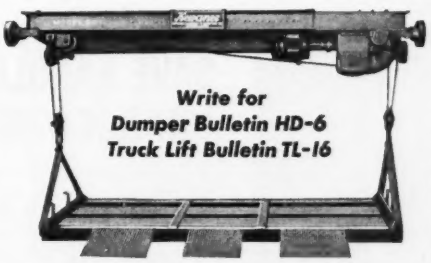
UNLOADS all sizes of Trucks and big Tractor Trailers in a "jiffy." Takes all the time-stealing hard work out of unloading...eliminates waiting time and keeps trucks "on the go."

Evidence of KEWANEE performance and economy is overwhelming. It is substantiated by successive repeat orders from outstanding firms who have installed them in all their plants.

One elevator reports unloading over 1,000,000 bu. of grain in one month's operation with a two man crew, averaging over 100 trucks each working day.

Every Trucker and Grower is a real booster. They appreciate "no long waiting in line" in busy harvest seasons and they tell others. It attracts new customers, widens your territory and expands your volume.

WRITE FOR BULLETIN — find out how KEWANEE will cut your unloading costs.



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Extra strength channel steel frame provides rigid support for operating mechanism. All working parts are below the frame, permitting maximum lift.

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Whatever your unloading problem, there's a KEWANEE adaptable to it. We manufacture many different models to meet any condition.

KEWANEE Engineers can suggest a type best suited to your problem. Write for Free Bulletin and full information.

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BOOKS

Vavilov's Classic

Vavilov's great classic on biology has now been translated from the Russian into English and has been published by the Chronica Botanica Co.

Translator is K. Starr Chester, supervisor of agricultural research at the Battelle Memorial Institute, Columbus, Ohio.

The work contains a world of material and observations of interest to the biologist. The book is of interest in connection with the recent controversial developments of genetics and plant and animal breeding in Russia.

As is well-known, science in Russia has gone through an upheaval, and no branch has been more affected than genetics and breeding. The leading roles were played by Vavilov, the famous champion of classical genetics, and by T. D. Lysenko, the exponent of a biology that received the stamp of approval of the Soviet state.

Vavilov was liquidated by Stalin's regime in the early 1940's. Before that, he published this account, a masterful presentation of scientific reasoning, which remains the chief defense of orthodox genetics and breeding in Soviet Russia.

THE ORIGIN, VARIATION, IMMUNITY AND BREEDING OF CULTIVATED PLANTS. By N. I. Vavilov. Translated by K. Starr Chester. Chronica Botanica, Vol. 13, No. 1/6. 374 pages. $7.50.

Order through Soybean Digest, Hudson, Iowa.

LETTERS

More Organization Help

TO THE EDITOR:

The Missouri Farm Bureau is interested in any problem that they can help solve to the best interest of Missouri farmers and farmers of this nation. I am a member of the state board of the Missouri Farm Bureau. A director of your organization, Mr. H. H. Huddleston of Mississippi, made a good effort to arouse interest and stimulate thinking about soybean grades in the commodities group meeting of National Farm Bureau Convention recently held in Chicago, Ill.

After some discussion with Mr. H. I. Cohn, my employer, and your director, (my suggestions are not necessarily Mr. Cohn's thinking) I think it would be feasible and possible to sell this idea to farm organizations and they in turn arouse a farmer demand that would make the results of a future hearing of Grain Grading Boards of PMA much more receptive to a change in grades.

I would like to suggest that in working on this proposition that we say a change in grade would offer farmers a premium for cleaner harvesting and would never act as a penalty. Our bean buyers at country points like the present system because with substantial storage they can equalize that foreign matter by blending and buying across the scales most times with no penalties because of the present grade tolerance concerning foreign matter. An additional argument to small elevators and quick loading and shipping points might be that a premium on cleaner beans would work in the smaller handler's favor because storage facilities do not permit blending of more than a few of his receipts and certainly cannot help much when there is a break in the weather.

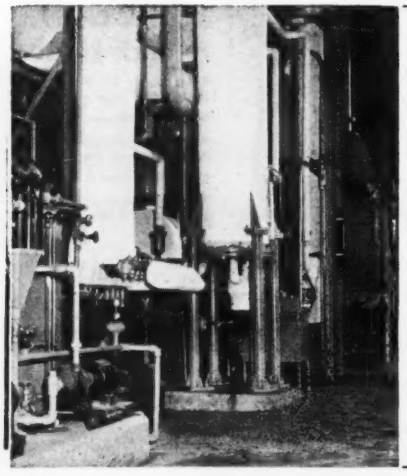
The president of Missouri Farm Bureau is a director of the National Farm Bureau organization and I feel we could arouse considerable interest and demand from Missouri if the entire commodity producing belt would participate.

The land grant colleges in the respective bean growing states through their extension service do considerable farmer education work. I believe interest could be aroused from this point that would be helpful. I am a member of an advisory committee to the extension service, College of Agriculture, University of Missouri, and will give this proposition a trial run when we have our next advisory committee meeting.—*Arline Avery, manager Cypress Land Farms Co., Portageville, Mo.*

—sbd—

SAME THING

Soybean pellets and soybean oil meal are one and the same thing, the Tariff Board of Canada has ruled. Apparently customs officers had claimed that the pellets had lost their identity as meal and came under a different tariff item than meal itself.



SAVE HANDLING AND SHIPPING CHARGES ON SOYBEAN MEAL

A Crown safe solvent extraction plant in a soybean producing community gives each farmer an opportunity to deliver his beans to the plant and take home from that same plant the high protein meal needed to economically feed his livestock and poultry. Thus, the plant saves freight and handling charges on the beans processed and eliminates freight on the return of the meal.

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Even bad weather won't stop your crop from getting off to a good start if you plant treated seed. And seed injured by frost or during combining has a better chance if it's treated with Du Pont "Arasan" seed disinfectant.

That's because "Arasan" protects seed against seed rot, mildew, blue stain and other diseases. Experiment stations prove that "Arasan" increases stands—in some cases up to 100%!

Regular use of "Arasan" over a lifetime would cost you no more than just *one* ruined crop because you pay only a few cents per acre to get the protection of "Arasan" every year.

For best results, treat the seed first—then inoculate just before you plant. "Arasan" protects seed from disease organisms and the inoculant helps the root system. Buy treated seed, or if you do the job yourself, follow directions on the "Arasan" package. For small grains and cotton use Du Pont "Ceresan" seed disinfectant. Du Pont, Semesan Section, Wilmington 98, Delaware.

Use seed treated with

GRITS and FLAKES... FROM THE WORLD OF SOY

◆ Roesling, Monroe & Co., brokers of crude and refined vegetable oils, Chicago, will change their address from 327 S. La Salle St. to Room 4136, Board of Trade Bldg., effective in April.

◆ M. H. Baker Co. has been appointed sales representative for the chemical division of General Mills, Inc. A new firm, it will handle the sale of General Mills' soybean oil, fatty acids and specialty products in Minnesota and northern Iowa.

◆ Spencer Kellogg & Sons, Inc., has put its Buffalo, N. Y., manufacturing properties, including a 1,250,000-bushel grain elevator, screw press processing plant and refinery, up for sale, according to the Wall Street Journal. The plant is a half-century old and employs about 90 workers.

◆ *Keller Baking Co., manufacturer of soy and other specialty loaves, Portland, Ore., celebrated a quarter century of being in the business recently.*

◆ Clark Yager has been appointed feed procurement director to direct purchases of all grains and ingredients for feed manufacture of Pillsbury Mills, Inc. He moved from Louisville, Ky., where he has been head of grain procurement of the Pillsbury-Ballard division, to Clinton, Iowa, Feb. 1.

◆ W. G. Brainerd has been appointed sales manager of the Wm. J. Ehrsam & Sons Manufacturing Co., Enterprise, Kans., effective Feb. 11. A milling engineer, he has had considerable experience in the machinery selling field.

◆ Fulton Bag & Cotton Mills announces the return of Otis G. West to New Orleans after an absence of over two years. He was transferred to Fulton Bag's Los Angeles branch in 1949 and while on the Coast he suffered a protracted period of illness from which he is now fully recovered.

◆ *Carl C. Farrington, Archer-Daniels-Midland Co., was elected president of the Minneapolis Terminal Elevator Association at the recent annual meeting.*

◆ The addition of Jack Goetz and Howard Heward to its Illinois sales staff was announced recently by Honeggers' & Co., Inc., Fairbury, Ill. Goetz will be district manager for the area surrounding Decatur, Ill., and Heward will manage sales in the south-central Illinois district, with his headquarters at Virden, Ill.

◆ Quonset Farm Building News for January emphasizes the profits to be made through on-the-farm storage of soybeans. It is published by the Stran-Steel division of Great Lakes Steel Corp., Detroit, Mich.

SUCCEEDS JOHNSON

E. M. WIECHER

E. M. Wiecher, now associated with Delphos Grain & Soya Products Co., has succeeded E. F. "Soybean" Johnson, well-known for many years to the soybean trade, who has retired.

As assistant manager, Wiecher is in charge of sales of soybean oil, meal and grains from the company's processing plants and terminal elevator at Delphos and Lexington, Ohio.

Wiecher, who is 42 years old, married and the father of four children, has spent his entire business life connected with the grain, feed manufacturing and processing industries. He spent 14 years with Ralston Purina Co. at its plants in St. Louis, Mo., Osceola, Ark., and Iowa Falls, Iowa. He was also connected with Frith & Co. at Dubuque, Iowa, for six years

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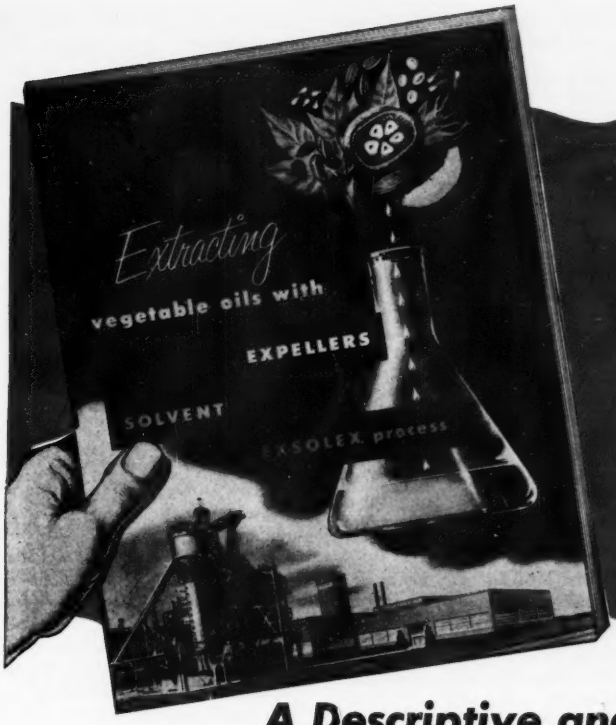

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ANDERSON

EXPELLERS* • SOLVENT EXTRACTION • EXSOLEX*

World's Largest Suppliers of Extraction Equipment

◆ "The Versatile Soybean," by T. James Mack, appeared in the January issue of Think, publication of the International Business Machines Corp.

◆ Lester M. Dorr, Minneapolis, has been named sales manager and Kenneth D. Ford manager of the feed and soybean plant of North Dakota State Mill & Elevator, Grand Forks, N. D. They replace H. A. Tollefson and C. A. Harvey, who recently resigned to buy a mill at Sioux Falls, S. D.

◆ Eugene P. Alexander, Chase Bag Co. sales representative, has been transferred from the company's Cincinnati territory to its Detroit sales office. His successor in Cincinnati will be D. L. Herrick, formerly of the Chase Milwaukee branch.

◆ *Opening quotations on the most active futures in soybeans and grains are being broadcast daily Monday through Friday at 9:45 a. m. over Radio Station WGN, Chicago.*

◆ The directors of the Chicago Board of Trade have added 2,841,000 pounds for the storage of crude soybean oil at the Des Moines, Iowa, plant of Spencer Kellogg & Sons, Inc., to that already declared regular at various points.

◆ The Buffalo, N. Y., manufacturing properties of Spencer Kellogg & Sons, Inc., are being put up for sale, according to the New York Journal of Commerce. They include a 1,250,000-bushel grain elevator, processing plant and refinery. Howard Kellogg, Jr., president, explained that the firm's solvent plant at Minneapolis could process more economically than the screw press system used at Buffalo.

◆ The Belmond, Iowa, plant of General Mills, Inc., has won an accident prevention award in the inter-plant safety contest for the second year in a row, according to Modern Millwheel, General Mills publication.

◆ *A fire that broke out in the drier of the solvent extraction plant of General Mills, Inc. Feb. 18 did an estimated $75,000 damage. The drier itself was wrecked and there was a loss of 4,000 bushels of soybeans.*

◆ Rock Island Lines has issued soybean maps for Illinois, Iowa, Minnesota, Arkansas, Kansas, Missouri and Nebraska showing production by counties for the years 1941, 1949, 1950 and estimated production for 1951. Locations of processing plants are shown.

◆ In a new move to expand the Borden Co.'s research program Dr. Richard Block has been appointed director of the special products division's new biochemical laboratories. Recognized as one of the nation's leading authorities on protein composition, Dr. Block will direct extensive laboratory research in this and other fields of nutrition. He is author of several outstanding books dealing with protein nutrition.

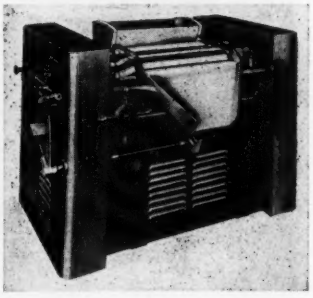
◆ E. Arnold Bisbee, manager of linseed and soybean oil sales of Falk & Co., Chicago, has been appointed to head up solicitations within the paints, oils and wallpaper group of the 1952 Red Cross Fund campaign's business division in the Chicago area.

and for the past two years with the Galesburg Soy Products Co., Galesburg, Ill.

Johnson is now living in Columbus, Ohio.

—s b d—

NEW MILL BY ROSS



Charles Ross & Son Co. of 148-156 Classon Ave., Brooklyn, N. Y., announces its new No. 52T 14-by-32-inch and 9-by-24-inch mills which are the latest development in their line of three roller mills and incorporate many improvements.

Dispersion or particle size reduction is accomplished along the full production face of the rolls as new type easily removed hoppers ride off the outside taper of the rolls. Latest type of thin wall roll construction and full length water cooling assure uniform grinding and temperature control. The three rolls revolve at specially determined differential speeds and front roll speeds of 350 RPM are used without excessive heating due to the specially bored cooling chambers in the roll construction.

The mills are said to be extremely quiet in operation using heavy self aligning roller bearings throughout and helical gears which operate in continuous oil bath lubrication.

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Brokers of Soybean Oil and Proteins
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Glidden research, concentrated on the business of realizing the full promise of the versatile soybean, has produced a host of soya materials which are now playing useful roles in the manufacture of a wide variety of products. These include paper, wallpaper, insulating board, paint, floor coverings, textiles, rubber, leather, insecticide sprays, fire-fighting foam, gasoline, grease, oil, adhesives and emulsions. Glidden's complete technical service is always available to help determine the value of any soybean materials in your field.

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Just as they both belong in a well balanced farm program, so do minerals and fertilizers belong in your soil. Minerals are just as important to the health of your soil as they are to the health of the human body. Soil poor in minerals cannot produce crops rich in vitamins. ES-MIN-EL contains the essential mineral elements of Boron, Copper, Manganese, Zinc, Iron and Magnesium, all essential to healthy productive soil. Return these essential mineral elements to your soil — apply ES-MIN-EL now!

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ES-MIN-EL is now available in spray or dust form. If you haven't mineralized your soil, you can now feed these essential minerals to your plants through the leaves and stems —ES-MIN-EL spray or dust is a neutral form of Copper, Manganese and Zinc.

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that your local fertilizer dealer furnish you a completely mineralized fertilizer containing the essential mineral elements!

Free Booklet Send card or letter to Tennessee Corp., Grant Building, Atlanta, Georgia or Lockland, Ohio.

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Atlanta, Georgia — Lockland, Ohio

WASHINGTON DIGEST

By WAYNE DARROW
Washington Correspondent for The Soybean Digest

● **DECONTROL?** OPS has a high-powered committee of seven studying the problems of decontrol. It started as a window-dressing move but has become serious. They're getting an executive director from outside the agency.

It doesn't mean that decontrol is necessarily coming soon, but the spadework for such a move is underway.

Decontrol talk is widespread on the Hill, and OPS wants to beat Congress to the draw. That's the chief present significance of the OPS study. Idea is to keep off the defensive, if possible. Lay the decontrol picture and all its consequences on the table at the start, instead of having the details dragged out painfully, one by one.

First objective of the OPS study is to set up criteria for determining the conditions that should prevail before decontrol of a commodity or group of commodities should be undertaken.

Second, the problems that would arise with each commodity in each area in the event of decontrol are to be listed and evaluated.

Third, methods and procedures for decontrol of each commodity or group are to be outlined.

The new strategy fits Ellis Arnall, the new OPS boss, perfectly. He's firm but not pugnacious like Mike DiSalle, and Congress is prepared to like him. Of course, he's in his honeymoon period, and that can't last indefinitely.

However, Arnall will get a good reception on the Hill with this straight-forward approach of let's-sit-down-and-talk-decontrol. He'll be starting right off on the angle congressmen are thinking most about.

As a matter of fact, few of them think price controls will be voted out, but many are playing with decontrol formulas. It's just possible that a deal may be made.

If so, ceiling regulations would likely be retained, but suspended in "safe price" areas. OPS would be kept on the job ready to throw the control machinery into gear if and when inflation comes. Like keeping an army and navy ready for possible trouble.

Something like this falls within the scope of what Congress and the Administration might do. It would have a better chance of adoption than decontrol of whole big commodity groups, like feeds, livestock, potatoes or cotton—for all of which Congress will be pressured.

Meantime, OPS is taking a fresh look at meal and oil ceilings the first week in March. This follows the conference with crushers Feb. 29, though it has been planned for a month. The industry advisory committee is to be polled. If a majority want to study the situation with view to possible changes, OPS will call the committee together. Anything tentatively agreed upon would require two weeks or more to translate into new regulations. Upshot is that ceiling changes aren't probable before late March, if then.

Corn price ceilings won't be set. It can be said just about that emphatically because USDA will fight any such OPS move all the way to the White House, if necessary. USDA doesn't want corn ceilings at the very time it's putting on a drive to get big corn acreage.

Market officials expect corn prices to rise sharply—perhaps to ceiling levels—after the wet corn is gone. A big spring price rise usually follows a wet corn year.

● **BEAN OUTLOOK.** The way meal is being fed up, officials doubt enough beans will be planted to furnish all the meal farmers would like in 1952-53. Some think meal rather than corn is the big 1952 production problem. What to do with the oil is another matter—markets for absorbing all of that aren't now in sight.

Here are 1950-51 soybean crushing, export and disappearance figures used by USDA:

	SOYBEANS		SOYBEAN MEAL	
	Crushed	Exported	Total Meal	Available for Feed
	bu.	bu.	tons	tons
October-December	67,056,000	10,501,000	1,565,000	1,522,000
January-March	72,281,000	6,110,000	1,699,000	1,514,000
April-June	61,020,000	9,555,000	1,427,000	1,382,000
July-September	51,278,000	1,660,000	1,197,000	1,291,000

Corresponding figures for Oct.-Dec. 1951: Beans crushed—67,701,000 bu. Beans exported—7,281,000 bu. Total meal production—1,577,000 tons. Available for feed—1,551,000 tons.

The meal available for feed presumably represents what is fed, except for what may be held over in inventories. (Officials think there was some thus held out in the last quarter of 1951.) It's the total meal production figure with meal exports and other uses subtracted, and meal imports added.

The 1950-51 meal exports were 181,000 tons, of which 121,000 tons were shipped in the Jan.-Mar. quarter. Meal imports were 32,800 tons. Other uses were 30,000 tons.

Some of the Senators who voted down the bill to repeal the tightened-up restrictions on imports of dairy and peanut products say they'll switch around and vote against their extension in June.

Eleven countries have protested this extra import ban as an outright repudiation of U. S. trade agreement treaties. There is talk of trade retaliation, though no real threats have been made. All are waiting to see what Congress does in June.

● **LIVESTOCK.** The livestock situation is mixed. After one of the biggest February market runs of hogs

in history, and ruinously low prices, receipts will drop sharply in March and prices bounce up. Hogs will be scarce and high-priced next fall—and corn relatively cheap if the crop is fair or better.

Fed cattle marketings should increase fast from March to June. All signs point to lots of steers to be marketed then. Prices of top grade stuff probably will decline sharply to a low in May-June, then make a strong summer recovery because fed steers will be relatively short in August and after.

All the 6-million-head increase in cattle numbers in 1951 was with beef animals. Dairy cattle numbers decreased a little, but a small uptrend is due this year because dairy heifers of one to two years old have been increasing moderately since 1949.

● **BAE ESTIMATES.** The attack on BAE's crop estimate system has fizzled in Congress so far because of lack of witnesses to testify adversely in the House agriculture subcommittee hearings. They're in charge of Rep. Abernethy (D., Miss.). The first objective was to take BAE apart because of the big misses in 1951 cotton crop estimates. That's boiled down now to failure to take the weather into account soon enough.

Abernethy was prepared to move from cotton to corn, wheat, and soybeans, but representatives of those producing groups haven't shown much interest.

The senate investigation of USDA is slow in starting. Paul Cotter is the counsel. He's an ex-FBI man, and was head of Justice Department's espionage and sabotage section during the war. He worked on the RFC probe, and wanted the same accounting firm that helped him then—but was turned down. He has a staffing problem.

Senate hearings are two months away. The fear of Farm Bloc leaders of both parties is that the probe may damage price supports. They don't expect much mink coat stuff to be uncovered, but enough busts in official judgment to be shown to bring CCC policy into question.

USDA officials expect some justified, some unjustified mistakes in judgment to be disclosed. They've been uncovering them for a year as PMA has been painfully getting its house in order.

The biggest official gripe is that the blame for irregularities is all pinned to CCC. They charge the primary fault is with a few warehousemen.

—s b d—

URGES CEILING LIFT

In view of the critical protein meal supply situation the American Feed Manufacturers Association announced Feb. 9 it would urge the Office of Price Stabilization to take immediate action to remedy the "ridiculous condition."

The Association recommended that the OPS:

Remove ceiling prices on soybeans and all soybean products; or remove the ceiling only on soybean meal and in case soybeans reach the legal minimum establish a flexible soybean meal ceiling based on a reasonable processing charge in relation to the current price of oil, or allow feed manufacturers to include the actual cost of "toll meal" in figuring the prices of manufactured feed.

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"... and what's wrong with a farmer making a profit?"

When farmer Huck Woodward asked that question at one of our "bull sessions" in front of the Bank, you should have seen the look on their faces.

"What most of you guys don't realize," he continued quietly, "is that we farmers are in *business* just as much as the Bank here is. There's not a farmer in this county who doesn't hope to have money left over for *himself* after he sells his livestock or crops and pays his bills. He may not think of it as a *profit*, but that's what it is: It's his reward for hard work and the risks he's taken. Any farmer who can invest his land, equipment and sweat in such a way as to make a profit is certainly entitled to it."

Huck's serious blue eyes looked directly at young George Gregory as he said, "Here in America we have freedom: Freedom to succeed, freedom to fail. Profits are the reward of the man who succeeds. Under this system, a few people *do* fail; yet so many more *succeed* that we now enjoy a standard of living envied secretly by the whole civilized world—even advocates of Socialism and Communism. Nevertheless, a tiny minority of our own people would have us surrender our precious freedom in favor of government control of business and agriculture. Regulation by regulation, control by control, they would break the spirit of the men who have made America bountiful: Men bold enough to risk a *loss* in the hope that they may make a profit.

"Let us be on guard."

CARGILL
SPECIALISTS IN SERVING *Agriculture*

OFFICES IN MINNEAPOLIS AND 35 OTHER CITIES

This Advertisement also appears in The Farmer, The Dakota Farmer and 9 other publications.

--- MARKET STREET ---

We invite the readers of THE SOYBEAN DIGEST to use "MARKET STREET" for their classified advertising. If you have processing machinery, laboratory equipment, soybean seed, or other items of interest to the industry, advertise them here. Rate: 10c per word per issue. Minimum insertion $2.00.

WANTED TO BUY—SEED FOR HOKkaido and Willomi vegetable soybeans. Advise quantity available and price. John R. Schmidt, Wheatland Engineering Co., Rt. 1, Plainfield, Ill.

SEED DIRECTORY

A charge of $1 will be made to subscribers for listing one variety in the April issue, 50c for each additional listing. Quantity for sale and variety are listed.

ARKANSAS

Blytheville—Farmers Soybean Corp., Box 692, noncertified Ogden, bin run or cleaned and sacked.

Stuttgart—Jacob Hartz Seed Co., Inc., 2,500 bu. uncertified Volstate, 3,000 bu. uncertified Dortchsoy 31, 1,000 bu. uncertified Roanoke, Ogden and Mamloxi.

ILLINOIS

Bloomington—Ed R. Smith, 2009 E. Jackson, 5,000 bu. field certified Adams, 5,000 bu. field certified Hawkeye, 1,000 bu. field certified Lincoln, 1,000 bu. field certified Blackhawk. All bulk or bagged.

Geneseo—C. D. Ford & Sons, Rt. 4, 500 bu. certified Adams, 500 bu. certified Hawkeye.

Pontiac—Steve Turner Farm Seeds, 1505 N. Aurora St., 2,000 bu. certified Adams, 2,000 bu. certified Hawkeye.

Ursa—Frank W. Lewis, 1,400 bu. certified Lincoln, 3,000 bu. uncertified Lincoln, 1,800 bu. certified Hawkeye.

Woodstock—Pell-Bari Farms, Inc., 305 Clay St., certified Blackhawk, certified and uncertified Hawkeye.

IOWA

Estherville—A. B. Rosenberger, 500 bu. certified Blackhawk.

Grinnell—W. C. Molison, Rt. 3, 700 bu. field certified Adams.

Grinnell—Carl Tokle, Rt. 4, 250 bu. certified Adams.

Hudson—Strayer Seed Farms, 800 bu. certified Adams, 300 bu. uncertified Bansei.

Nevada—Thomas E. Wilson Farm, Box 53, 900 bu. certified Hawkeye.

KANSAS

Carbondale—Lowell Chamberlain, 300 bu. certified Wabash.

MINNESOTA

Bird Island—Anthony Ziller, 600 bu. registered Blackhawk, 2,000 bu. uncertified, certified and registered Capital.

Morton—Harold Buscho, 200 bu. Minnesota registered Blackhawk.

Sleepy Eye—Arthur V. Domeier, Rt. 1, 100 bu. registered Blackhawk.

MISSISSIPPI

Hollywood—Bard Selden, 3,000 bu. Ogden, low moisture, high germination, artificially dried, stored in metal bins.

MISSOURI

Bragg City—Jeff Wade, Jr., Rt. 1, 1,600 bu. certified Ogden.

Laddonia—Carver Brown, Rt. 1, 600 bu. certified Wabash.

St. Charles—H. V. Seeburger, Rt. 1, 400 bu. uncertified S-100, 200 bu. uncertified Wabash, in paper bushel bags.

St. Louis 2—Cypress Land Farms Co., 314 Merchants Exch. Bldg., 1,000 bu. certified Adams, 2,500 bu. certified Hawkeye, 800 bu. uncertified Rickard Korean, 900 bu. Cypress No. 1, 500 bu. certified S-100, 2,000 bu. uncertified Ogden.

OHIO

Ashtabula—Clark Mann & Son, Rt. 2, 1,000 bu. certified Monroe.

Greenwich—W. W. Briggs, Rt. 2, 500 bu. certified Monroe.

TENNESSEE

Newbern—C. Hays Hollar, Box 127, 500 bu. certified Wabash, 300 bu. Wabash grown from certified seed, 300 bu. certified Ogden, 1,200 bu. Ogden grown from certified seed.

—s b d—

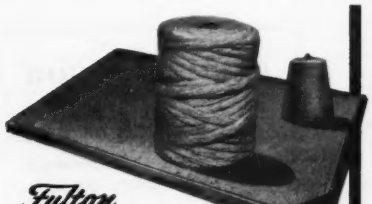
SOYBEAN GLUE

The soybean is the basis of a glue particularly suitable for the manufacture of high-grade, low-cost fiberboard made by a process awarded a patent recently. It is for use primarily in the manufacture of industrial laminated paper containers such as cartons, boxes and barrels.

Inventors are Glen E. Babcock, Vernon L. Johnsen and Allan K. Smith, Peoria, Ill. Patent 2,580,391 was the award. Rights are assigned to the U. S. government as represented by the Secretary of Agriculture.

FULTON QUALITY TEXTILE BAGS *HAVE a DOUBLE LIFE*

When you ship soybean meal in textile bags, either burlap or cotton, you are giving a plus value to your customers. Empty textile bags have a high salvage or reuse value that is welcomed by feed mills or farmers. Sturdy cotton and burlap bags are more resistant to tearing or snagging, stack and handle easier, and because of their neat, fresh appearance add prestige to your brand. Call or write your nearest Fulton Factory Branch for full information and prices.



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also manufactures EAGLE SAIL TWINE and MACHINE THREAD, the finest qualities for bag closing, and FULTEX TRIPLE STRENGTH TARPS OF 1000 USES.

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Multi-storage availability with ESSO HEXANE!

When you specify ESSO HEXANE you get assured, prompt shipment directly from Baytown, Texas, or Bayonne, New Jersey. Quick delivery to your door in tank cars, tank trucks, or drums. Esso Hexane is always *available—when* you want it, *where* you want it!

YOU CAN DEPEND ON ESSO HEXANE FOR

- **MULTI-STORAGE AVAILABILITY** — can be shipped promptly from Baytown, Texas, or Bayonne, N. J.
- **MODERN HANDLING METHODS** — separate tank storage, pumping lines, tank cars and trucks, are used in all Esso Solvent handling operations. Prompt, efficient delivery to your doorstep is assured.
- **UNIFORMITY** — made in modern refineries from carefully selected crude oil sources.
- **HIGH OIL RECOVERY** — results from "balanced solvency." Recovered oil has good color and refining properties.
- **EFFICIENT SOLVENT RECOVERY** — narrow boiling range allows complete removal from extracted oil and meal.
- **PURITY** — high purity helps avoid non-recoverable residues. Low non-volatile content.

Controlled high quality helps produce larger profits with versatile, dependable Esso Solvents.

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ESSO STANDARD OIL COMPANY — Boston, Mass. — New York, N. Y. — Elizabeth, N. J. — Philadelphia, Pa. — Baltimore, Md. — Richmond, Va. — Charleston, West Va. — Charlotte, N. C. — Columbia, S. C. — Memphis, Tenn. — New Orleans, La.

FOR TECHNICAL ASSISTANCE

If you have a solvents problem or want further information on the specifications and characteristics of Esso Hexane — write or call our office nearest you. Our technicians will be glad to assist you.

IN THE MARKETS

Markets Hold Their Own

There was little change in the markets during February, with March soybean futures losing a little ground and crude oil about holding its own. May futures also lost some ground.

Beans and oil showed some strength at midmonth but weakened again later.

Bulk soybean oil meal basis Decatur was nominally at the $74 ceiling all month, but it was practically unavailable at that price, in spite of heavy production of meal.

But there were plenty of soybean mixes on the market. These included minerals, lecithin, corn, feeding oils and standard middlings. Early in the month these sold for $10 to $15 above ceilings, but later the premium dropped to $8 to $10. Trading in mixes dwindled considerably the latter part of the month, it was reported.

Weakening factors in the bean and oil markets were the declines in lard and grain and reports of sizable shipments of Manchurian soybeans to Europe. There were spurts of selling by country shippers at times during the month.

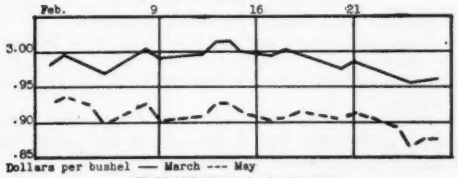
A record high of 68 million bushels was crushed in the Oct.-Dec. 1951 quarter, compared with 67 million in the same quarter of 1950, and 52 million in the like period of 1949, according to the Census Bureau. Crushings of soybeans by months the first quarter were as follows in million bushels with the comparable months of 1950 in parenthesis: October 21.6 (19.6), November 23.0 (22.8), and December 23.1 (24.7).

Mexico was reported interested in 5,000 tons of soybean oil. Holland was granted funds for the purchase of 20,000 tons of soybeans, and there was an inquiry from Japan.

Production of fats and oils, in the year that began Oct. 1, 1951, probably will total over 12.5 billion pounds, 0.2 billion above the record of a year earlier, reports USDA's Fats and Oils Situation. Increases in cottonseed oil and lard will more than offset drops in butter, soybean, peanut, and linseed oils. Total output includes the oil-equivalent of domestic oilseeds exported for crushing.

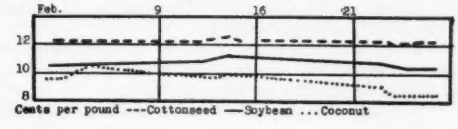
Although production of linseed oil is likely to be down, it still will be at a high level. Crushings of flaxseed were at a record level in the past crop year and beginning stocks in 1951 were less than in the year before. The 1951 flaxseed crop is down 16 percent, mainly because of a sharp drop in yield. A slight decline in butter produc-

FUTURES, CHICAGO NO. 2 SOYBEANS



Dollars per bushel — March --- May

CRUDE VEGETABLE OILS, TANKCARS



Cents per pound ---Cottonseed —Soybean ...Coconut

THE PART PURINA PLAYS IN

THE SOYBEAN CYCLE

From your farm, your soybeans move to

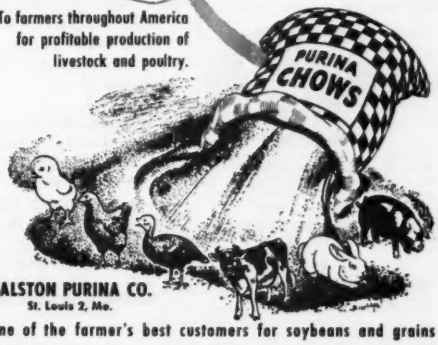
A country elevator or directly to

One of Purina's six soybean processing plants or one of many other processing plants. Soybean meal from both sources goes to

A Purina Chow Mill, where the meal from your soybeans and other ingredients are combined to make research-proved Purina Chows

Which are distributed through Purina Dealers

To farmers throughout America for profitable production of livestock and poultry.



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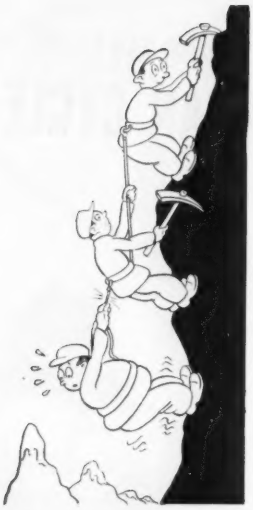
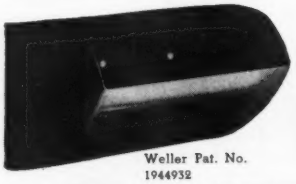
One of the farmer's best customers for soybeans and grains



THERE'S ONLY *One* MOUNT EVEREST

Mount Everest in the Himalayas on the frontier of Nepal and Tibet towers 29,141 ft. from base to peak and is the highest known mountain in the world.



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And it is rightfully rated by elevator operators the world over as absolute tops in capacity, efficiency and downright economy of operation.

IT'S THE *Curve* THAT *Counts*

The patented Logarithmic Curve design of the Calumet Cup has never been successfully imitated. Its performance has never been duplicated.

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About the one and only genuine Calumet Cup. The cup that scoops up, elevates and **completely** discharges super capacity loads. That eliminates backlegging. That can be spaced closer on belt, perfectly balanced and operated over any size pulley at any permissible speed.

BIWELCO METAL PRODUCTS

Include Elevator Legs, Heads, Boots, Bins, Hoppers, Car-Loading Spouts and all other Sheet Metal Work to specification.

Bring Your SCREW CONVEYOR PROBLEMS To Us

We can make prompt deliveries from stock.
The BIWELCO seal on any metal product is a guarantee of quality and satisfactory service.
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Thirty-Eight Years Of Service To The Grain Trade

tion is expected. Output of butter in 1951-52 may be the lowest of record.

Production of edible vegetable oils may total a record 4.7 billion pounds, 7 percent more than a year earlier.

Due principally to the sharp increase in cottonseed meal output, supplies of all oilseed cake and meal were the largest of record and totaled over 2.8 million tons, in the October-December quarter, reports Production and Marketing Administration. This was 13 percent above last year and 43 percent above the five-year average. Part of the increase in all oilseed meal supplies this season was due to a reduction in stocks at crushing plants from 135,000 tons on Oct. 1 to 103,000 on Jan. 1 this season as contrasted with an increase in stocks last season from 261,000 on Oct. 1, 1950 to 323,000 tons on Jan. 1. Imports of oilseed meals the first three months at 55,000 tons were about the same as a year earlier while exports at nearly 60,000 tons were about four times as large.

March No. 2 soybeans, Chicago, opened for the month at $2.98½ and closed at $2.96¼. High was $3.01 Feb. 14. Low was $2.95½ Feb. 27.

Crude soybean oil, tankcars, f.o.b. Decatur, opened for the month at 10½c and closed at the same figure.

MEMPHIS SOYBEAN OIL MEAL FUTURES FEB. 29*
(Contract 100 tons)
Soybean Meal Bulk—Decatur
Mar., 74.00b; May, 74.00b; July, 74.00b; Aug., 74.00b; Oct., flat 71.25; Dec., 70.00 @70.40; Jan., 69.50 @70.25.

CHICAGO SOYBEAN OIL MEAL FUTURES FEB. 29*
Mar., 74.00b; May, 74.00b; July, 74.00b; Oct. 70.40b-70.90a; Dec., 69.75b-70.50a.

CHICAGO SOYBEAN OIL FUTURES CLOSE FEB. 29*
Mar., 10.42; May 10,70b-10.73a; June, 10.65b-10.80a; July, 10.80; Sept., 10.92b-10.95a; Oct., 10.95b-10.99a; Nov., 10.95b-11.02a; Dec., 10.98b-11.05a.

NEW YORK SOYBEAN OIL FUTURES CLOSE FEB. 29*
Mar., 10.40b; May, 10.63b; July, 10.75b; Sept., 10.86b.
a-asked. b-bid. *Reported by the Chicago edition of Wall Street Journal.

● **FACTORY USE SOYBEAN OIL.** Factory production of crude soybean oil in November totaled 225,365,000 lbs. compared with 214,799,000 lbs. in October, reports Bureau of the Census. Factory production of the refined oil was 136,668,000 lbs. in November; 148,782,000 lbs. in October.

Factory consumption of crude soybean oil totaled 147,511,000 lbs. in November; 154,949,000 lbs. in October. Consumption of refined soybean oil in November was 136,660,000 lbs.; 147,351,000 lbs. in October.

Factory and warehouse stocks of crude soybean oil totaled 164,529,000 lbs. Nov. 30; 121,135,000 lbs. Oct. 31. Stocks of refined soybean oil totaled 73,602,000 lbs. Nov. 30; 75,261,000 lbs. Oct. 31.

Usage of crude soybean oil in November: soap 52,000 lbs.; paint and varnish 318,000 lbs.; lubricants and greases 42,000 lbs.; other inedible uses 1,458,000 lbs.

Factory usage of refined soybean oil in November: shortening 45,561,000 lbs.; margarine 4,332,000 lbs.; other edible products 3,953,000 lbs.; soap 43,000 lbs.; paint and varnish 4,459,000 lbs.; lubricants and greases 16,000 lbs.; other inedible products 7,564,000 lbs.

Usage of hydrogenated edible soybean oil in November: shortening 17,730,000 lbs.; margarine 33,304,000 lbs.; other edible products 200,000 lbs.; inedible products 7,000 lbs.

Factory production of crude soybean oil in December totaled 221,400,000 lbs. Production of the refined oil totaled 149,822,000 lbs. in December.

Factory consumption of crude soybean oil totaled 161,746,000 lbs. in December. Consumption of refined soybean oil was 134,516,000 lbs.

Factory and warehouse stocks of crude soybean oil totaled 197,246,000 lbs. Dec. 31. Stocks of the refined oil totaled 83,920,000 lbs. Dec. 31.

Usage of crude soybean oil in December: soap 57,-

000 lbs.; paint and varnish 304,000 lbs.; other inedible products 1,325,000 lbs.

Usage of refined soybean oil in December: shortening 38,496,000 lbs.; margarine 6,229,000 lbs.; other edible products 5,706,000 lbs.; soap 39,000 lbs.; paint and varnish 4,340,000 lbs.; other inedible products 7,579,000 lbs. Usage of hydrogenated edible soybean oil in December: shortening 14,721,000 lbs.; margarine 34,055,000 lbs.; other edible products 164,000 lbs.

● **STOCKS.** Production and Marketing Administration's commercial grain stock reports.

U. S. Soybeans in Store and Afloat at Domestic Markets (1,000 bu.)

	Feb. 4	Feb. 11	Feb. 18	Feb. 25
Atlantic Coast	1,546	1,101	1,154	1,000
Gulf Coast	213	384	498	222
Northwestern and Upper Lake	334	303	295	301
Lower Lake	2,020	1,469	1,259	1,180
East Central	2,347	2,151	1,999	1,780
West Central Southwestern & Western	1,496	1,286	1,264	1,234
Pacific Coast	0	0	0	0
Total current week	7,956	6,694	6,469	5,717
Total year ago	13,145	13,475	12,680	12,686

U. S. Bonded Soybeans in Store and Afloat at Canadian Markets

Total current week	162	6,821	90	5,786
Total year ago	96	13,571	96	12,782

STOCKS OF SOYBEANS, JAN. 1, WITH COMPARISONS

Position	Jan. 1, 1950 3/	Jan. 1, 1951	Oct. 1, 1951	Jan. 1, 1952
		Thousand Bushels		
*On Farms	60,853	101,728	2,675	103,380
‡Terminals	16,133	13,915	670	9,760
†Processing Plants	66,508	77,163	1/ 552	62,040
*Int. Mills, Elev. & Whses. 2/	35,203	38,945	257	44,846
Total	178,697	231,751	4,154	220,026

*Reported by Crop Reporting Board.
‡Reported by Grain Branch, P.M.A.
†Reported by Bureau of the Census.
1/ Adjusted to stocks of old soybeans; total October 1, 1951 was 4,274,000 bushels.
2/ All off-farm storages not otherwise designated.
3/ Farmstocks are subject to revision when revised 1949 production becomes available, total will be affected accordingly.

OFF-FARM 1/ STOCKS OF SOYBEANS, JANUARY 1, 1952, WITH COMPARISONS

State	Jan. 1, 1951	Oct. 1, 1951	Jan. 1, 1952	State	Jan. 1, 1951	Oct. 1, 1951	Jan. 1, 1952
	Thousand Bushels				Thousand Bushels		
Ohio	11,078	162	12,091	Kans.	1,616	111	2,339
Ind.	11,331	53	8,296	N. C.	1,876	4	1,902
Ill.	48,029	598	40,429	Ky.	2,653	34	2,125
Minn.	6,578	68	5,641	Ark.	5,056	5	4,550
Iowa	17,836	217	16,230	All Other	16,436	214	14,177
Mo.	7,534	13	8,866	U. S.	130,023	1,479	116,646

1/ Includes stocks at processing plants, as enumerated by the Bureau of the Census; Commercial stocks at terminals reported by Grain Branch, P.M.A.; and stocks in interior mills, elevators and warehouses, estimated by the Crop Reporting Board.

● **EXPORTS.** U. S. exports of soybeans and soybean oil for December, as reported by the Office of Foreign Agricultural Relations:

Soybeans	2,572,188 bu.
Soybean oil (crude)	27,650,482 lbs.
Soybean oil (refined)	4,831,004 lbs.

Converted to a soybean equivalent basis, the exports for December amounted to 5,923,042 bushels of soybeans.

The grain inspection department of the New Orleans Board of Trade reports that 864,000 bushels of soybeans were cleared for export shipment from the Port of New Orleans during the month of January, compared with 596,000 bushels in December.

Of this amount, 93,000 bushels were destined for Norway, 431,000 bushels for Japan, and 340,000 bushels for Israel.

A total of 16,562,000 bushels of soybeans were cleared for shipment from New Orleans from July 1 through January, the Board of Trade reports.

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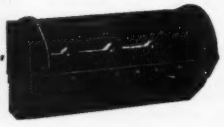

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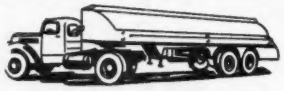

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● **PROCESSING OPERATIONS.** Reported by Bureau of Census, Department of Commerce, for November, December.

PRIMARY PRODUCTS EXCEPT CRUDE OIL, AT CRUDE OIL MILL LOCATIONS: PRODUCTION, SHIPMENTS AND TRANSFERS AND STOCKS, DECEMBER 1951-NOVEMBER 1951

Products	Production		Shipments and transfers		End of month stock	
	Dec. 1951	Nov. 1951	Dec. 1951	Nov. 1951	Dec. 31, 1951	Nov. 30, 1951
SOYBEAN:						
Cake and meal†	541,418	*536,114	537,825	*532,703	34,048	30,455
Lecithin‡	1,731,862	1,761,608	1,361,212	1,482,424	2,845,204	2,474,554
Edible soy flour, full fat†	(1)	820	(1)	669	260	242
Edible soy flour, other†	4,439	4,799	4,175	4,843	1,341	1,077
Industrial soy flour†	(1)	1,701	(1)	1,687	955	582

† Unit of measure in tons. ‡ Unit of measure in pounds. * Revised. (1) Not shown to avoid disclosure of individual operations.

SOYBEANS: RECEIPTS, CRUSHING AND STOCKS AT OIL MILLS, BY STATES, DECEMBER 1951—NOVEMBER 1951
(Tons o. 2 000 pounds)

State	Receipts at mills		Crushed or used		Stocks at mills	
	Dec. 1951	Nov. 1951	Dec. 1951	Nov. 1951	Dec. 31, 1951	Nov. 30, 1951
U. S.	512,925	*981,968	693,284	*691,077	1,861,209	*2,041,568
Arkansas	14,043	61,832	17,458	15,495	118,175	121,590
Illinois	175,239	*251,405	287,777	*295,519	624,969	*737,507
Indiana	33,335	29,878	60,764	61,432	111,775	139,204
Iowa	81,056	243,359	108 215	100,247	225,325	252,484
Kansas	16,616	22,652	20,534	19,263	33,360	37,278
Kentucky	9,598	24,004	17,783	18,105	60,853	69,038
Minnesota	16,391	52,134	32,185	27,347	30,212	46,006
Missouri	16,829	40,817	20,997	22,376	124,978	129,146
Nebraska	3,947	19,756	5,315	5,038	26,380	27,748
N. Carolina	25,294	30,749	3,884	4,426	53,484	32,074
Ohio	51,916	70,422	64 846	65,073	208,463	221,393
Oklahoma	5,466	1,809	2,755	3,025	10,097	7,386
Texas	(1)	(1)	(1)	———	(1)	(1)
All other	63,195	133,151	50,771	53,731	233,138	220,714

* Revised. (1) Included in "All other" to avoid disclosure of individual operations.

SOYBEAN PRODUCTS: PRODUCTION AND STOCKS AT OIL MILL LOCATIONS, BY STATES, DECEMBER 1951—NOVEMBER 1951

State	Crude oil (thousand pounds)				Cake and meal (tons)			
	Production		Stocks		Production		Stocks	
	Dec. 1951	Nov. 1951	Dec. 31, 1951	Nov. 30, 1951	Dec. 1951	Nov. 1951	Dec. 31, 1951	Nov. 30, 1951
U. S.	221,400	*224,834	96,425	*77,051	541,418	*536,114	34,048	30,455
Arkansas	5,200	4,529	2,794	2,260	13,630	11,868	1,497	1,385
Illinois	94,400	*100,199	36,022	30,288	218,393	*220,568	13,537	10,218
Indiana	20,553	21,018	7,392	6,352	47,615	48,199	3,164	1,406
Iowa	33,147	* 30,467	15,469	9,987	87,715	80,650	3,295	3,431
Kansas	6,353	6,014	3,672	2,752	16,486	15,596	1,018	829
Kentucky	6,350	6,437	955	707	13,638	13,868	752	505
Minnesota	9,291	8,094	5,175	3,585	25,531	21,929	1,112	829
Missouri	6,216	6,598	2,740	2,476	17,021	18,032	926	(1)
Nebraska	1,528	1,441	950	653	4,423	4,252	(1)	(1)
N. Car.	1,065	1,271	1,327	1,256	3,082	3,485	446	225
Ohio	21,198	21,774	7,349	6,374	59,915	51,640	3,038	2,004
Oklahoma	787	877	426	343	2,321	2,519	253	(1)
Texas	(1)	———	(1)	———	(1)	———	(1)	(1)
All other	15,312	16,115	12,154	*10,018	40,648	43,508	5,010	9,623

* Revised. (1) Included in "All other" to avoid disclosure of individual operations.

● **PRICE SUPPORTS.** The U. S. Department of Agriculture has announced that 1952-crop soybeans will be price-supported at $2.56 a bushel. Dollars and cents supports are announced at this time—in advance of spring planting—in accordance with forward pricing provisions of the Agricultural Act of 1949.

The fixed level of $2.56 a bushel reflects 90 percent of parity as of Nov. 15, 1951, in accordance with a support-level announcement made by Secretary Brannan last November. Support for 1951-crop soybeans is $2.45 a bushel. Price support will be implemented by CCC loans and purchase agreements.

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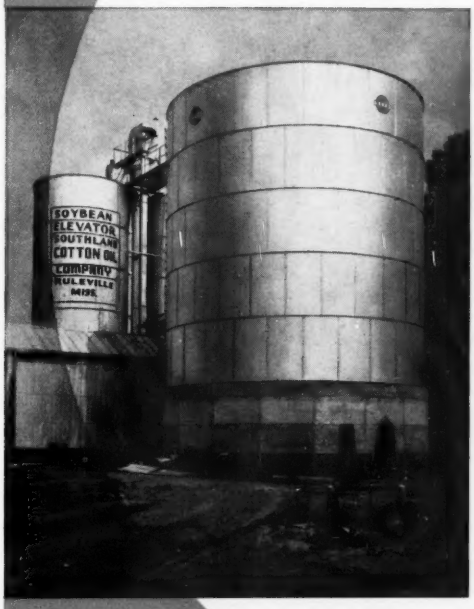

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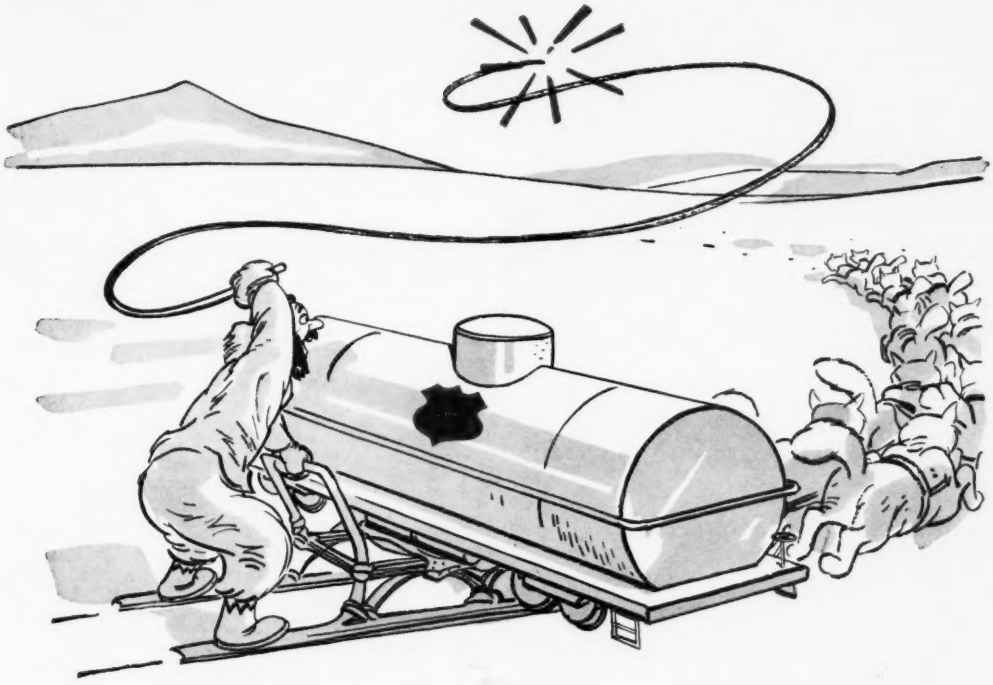

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